# THE IRON AGE

*Established 1855* New York, December 19, 1912 *Vol. 90: No. 25*


# Saving Space in a Steel Warehouse

## System of Steel Racks Used by a Cleveland Jobbing Interest for the Convenient Handling of Bars and Sheets

An interesting example of what can be done in economizing space in a steel storage warehouse and in effecting convenient arrangement for the inspection and handling of stock by means of steel storage racks is shown in the warehouse of the Betz-Pierce Company, 2234 East Ninth street, Cleveland, Ohio. The company handles high grade steel and it has to keep an extensive variety in various sizes in stock to supply its trade. The warehouse is located in a two-story brick structure, 60 x 90 ft., which provides less than 11,000 sq. ft. of floor space, including the room occupied by offices. The business of the company has grown rapidly since it was established 15 months ago, and the company became badly cramped for room. Being favorably situated as to location it did not desire to secure another site that would provide larger quarters so that the necessity arose to provide new methods of storing stock that would save space as compared with the system that was being employed by placing bars on end and laying sheets out on the floor.

In order to effect the desired economy in space a system of horizontal steel racks was outlined by Mr. Betz, and his plans were worked out by the engineering department of the Van Dorn Iron Works Company, Cleveland. The latter company recently installed the new racks. Wooden racks for the horizontal storage of steel are used in some warehouses, but steel racks are much stronger, more compact and have other advantages over wood. The racks in the Betz-Pierce warehouse provide a storage capacity of about 3000 tons, over 2500 tons of which is for bars and 400 tons in sheets. Practically every inch of floor space is occupied.

One of the Two Rows of Steel Racks for Storing Bar Stock on the First Floor of the Betz-Pierce Warehouse, Cleveland. On the Opposite Side of the Room Are Racks Largely Similar With Floor Space for a Driveway Between the Two Rows

The first floor is used for the storage of bar stock and the upper floor for sheet storage and the offices. On each side of the lower floor and extending practically the depth

of the room are rows of steel racks or pigeon holes 15 x 15 in. in the clear, five racks high and 16 ft. deep or of sufficient depth to store stock 20 ft. long. These racks are built of 2½ x 2½ x ⅜-in. angle iron with the exception that every alternate upright is 1¼-in strip of iron. The horizontal angles that run lengthwise are supported every 4 ft. by cross and upright supports, and the entire network of angle iron is firmly bolted together, forming racks that are perfectly rigid and will stand the strain of as much steel as they will hold. Each section or bin in the racks has a capacity of 45 tons. On top of these racks on one side of the first floor are smaller racks three rows high with 10 x 10-in. clear storage spaces and 10 ft. deep. The small racks are made of 1½ x 1½ x 5/16-in. angle iron. These small racks are for the storage of crucible steel. In the larger racks on one side is stored Norway iron, screw stock and shafting, and on the other side cold drawn, hot rolled, nickel and vanadium steel and some sizes of tool steel. A large number of racks permits the placing of only one size in a compartment and the convenient arrangement of stock so that the size wanted can be found immediately.

Steel Racks on the Second Floor of the Betz-Pierce Warehouse for Storing Sheets

For convenience in handling the largest sizes are stored on the lowest tier of racks, the sizes growing smaller on each tier above. Ample space is left on the center of the floor between rows of racks for loading wagons.

The storage racks for sheets on the second floor are built of 9-in. beams in three 16-ft. spans, the space also allowing a 40 in. extension from the span in the rear. The racks are 18 ft. deep so that they occupy a floor space of about 51 x 18 ft. They are three tiers high. These racks are of very heavy construction throughout, 50 tons of steel being used in building them. The beams are supported by 8-in. channel columns connected by a solid plate girder construction. No weight comes on the floor, the channel columns being supported by columns directly underneath the first floor. A 24-in. space is provided between the first and second rack and 10 in. between the second and third rack. The top rack is 5 ft. 10 in. above the floor. As the lower girder is several inches above the floor the storage space is also provided on the floor under the racks. The sheets rest on adjustable angles cut out so that they slide along the girders and can be spaced as needed. These racks are used for the storage of special sheets used in automobile work and in making metal furniture and high-grade galvanized sheets.

The warehouse is equipped with a 6-in. cold saw so that bars may be cut to any length. The company has arrangements outside of its warehouse for the testing of the various special steels it handles.

The Betz-Pierce Company is under the management of A. B. Betz, president, and Clifford E. Pierce, treasurer. T. L. Philott is secretary. Messrs. Betz and Pierce were both connected with the Bassett-Presley Company, Cleveland, the former for 20 years and the latter for 15 years. When the Bassett-Presley Company sold its jobbing warehouse to the Carnegie Steel Company they decided to establish a business of their own.

## Lantern Slides to Assist Sales

The J. W. Paxson Company, Philadelphia, Pa., foundry engineer and manufacturer of foundry supplies, has added an important adjunct to its selling equipment, being now prepared to give customers a more comprehensive idea of its line and detailed particulars of each product by lantern slides. A portable Bausch & Lomb lantern is used, taking electric current from the ordinary electric light socket, and demonstrations are given either at the plant of the buyer or at the company's offices in Philadelphia. By this means not only the different types of equipment but also actual installations in detail may be shown and fully explained. Several hundred lantern slides have already been made and more are in preparation. These cover the foundry engineering, melting furnace and cupola, cleaning and sand blast departments, etc.

---

The Allis-Chalmers reorganization committee has called the third assessment, amounting to $3 on the common and $6 on the preferred stocks, payable January 15. Payment of the third assessment leaves still to be paid $4 on the common and $8 on the preferred. The court has ordered that the foreclosure sale of the Allis-Chalmers properties take place February 3.

# An Important Southern Ore Field

### The Limonite or Brown Ore Deposits of Lawrence and Wayne Counties, Tennessee

BY EDWARD L. LULL

Lawrence and Wayne counties lie side by side in south central Tennessee and extend to the Alabama line. All mining operations have been conducted within 25 miles of Iron City. This town is in Lawrence County and on the Louisville & Nashville Railroad.

Geologically, the district is situated in the western division of the Appalachian province on the highland rim, south of the central basin of Tennessee. The region is a plateau dissected by five main streams, which flow into the Tennessee River. Broad dividing ridges separate the prominent drainage channels. The general altitude of the highlands is 900 ft. and the lowlands 550 ft.

All rocks exposed are of sedimentary origin and embrace deposition from the silurian to the tertiary. The iron formation consists of a primary and secondary deposit. During Mississippian time the St. Louis limestone was deposited. This formation was base-leveled by carboniferous, triassic and jurassic erosion. The cretaceous opened with a slight subsidence of the region, the sea advancing from the south, and encroaching areas of depression created numerous lagoons. The primary ore deposits were leached from the residual clays of the St. Louis formation, concentrated as a carbonate and precipitated in the lagoons as limonite. During pliocene time the sea again advanced over the region and worked up the previous formation into a secondary deposit consisting of fragmental St. Louis chert and limonite enclosed in a matrix of reddish-brown Lafayette clay. This formation occurs on the ridges at an elevation of about 750 ft.

The mines of the district are locally termed banks. These are pockets with an average depth of 20 ft. and embracing as high as a thousand acres. Ten per cent. is the minimum amount of ore allowable. There is little stripping, and open-pit methods are used. Mining is accomplished by light traction mounted steam shovels, and the ore is handled with small dinkeys and dump cars.

The ore is concentrated by log-washers. A modern plant, costing $150,000, with a capacity of 800 tons per day, is operating at Pinkney. The cost of mining is 60c. per ton, and concentrating 10c. An increased demand for these ores and the consequent improvement of equipment will materially improve these figures.

Mining has been carried on intermittently since 1832, the oldest being the Van Leer and the Wayne Furnace mines. The ore in the early days was dry screened and the pig iron made locally was transported to the Tennessee River by teams.

Commercial ore deposits are distributed over an area of 300 square miles in Wayne County, but are at present inaccessible. The Louisville & Nashville Railroad Company and the Tennessee Valley Iron & Railroad Company have completed definite arrangements for the joint construction of a railroad, starting at Iron City, Tenn., and extending in a northwesterly direction for 20 miles into Wayne County. The building of this road will be an important factor in the iron industry of the South, as it will connect these vast ore reserves with the furnaces and steel mills of the Birmingham district.

The district was described very completely in the October, 1912, Bulletin, published by the Tennessee Geological Survey. A portion of the accompanying table has been compiled from the information there given.

*Limonite Deposits of Lawrence and Wayne Counties, Tennessee*

| Present owners. | Bank. | Date of operation. | Area, acres. | Tonnage produced. | Tonnage available. | Consumers. | Analyses. FC. | Phos. | Mang. | $SiO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Sheffield Coal & Iron Co. | Hessemer No. 1 | 1902-1907 | No data | 170,000 | No data | Own use | ... | ... | ... | ... |
| | Hessemer No. 2 | 1902-1907 | No data | 130,000 | No data | Own use | ... | ... | ... | ... |
| | Couch | 1909-1912 | 8 | 185,000 | No data | Own use | ... | ... | ... | ... |
| | Ironside | 1890-1904 | 15 | 600,000 | No data | Own use | 52.5 | 0.83 | ... | 10.17 |
| | Van Leer | 1832-1837 | 20 | 2,000 | 335,000 | Van Leer Furnace | 53.2 | 0.81 | 0.69 | 5.71 |
| So. Tenn. Dev. & Mining Co. | Van Leer | 1832-1837 | 80 | 6,000 | 3,000,000 | Van Leer Furnace | 53.2 | 0.81 | 0.69 | 5.71 |
| | Mine No. 4 | 1832-1837 | 75 | 1,500 | 2,000,000 | Van Leer Furnace | 53.2 | 0.81 | 0.69 | 5.71 |
| | Mine No. 5 | 1832-1837 | 45 | 1,000 | 500,000 | Van Leer Furnace | 53.2 | 0.81 | 0.69 | 5.71 |
| | Mine No. 6 | ... | 7 | 0 | 60,000 | ... | 55 | 0.20 | 0.70 | 5.10 |
| Tenn. Valley Iron & Railroad Co. | Wayne Furnace | 1833-1875 | 1,000 | 145,000 | 50,000,000 | Wayne Furnace | 51.2 | 0.80 | 1.0 | 10.0 |
| | Nos. 1, 2, 3, 4, 5, 6 and 7 | ... | 2,000 | 0 | 100,000,000 | ... | ... | ... | ... | ... |
| Pinkney Iron Co. | Pinkney | 1887-1912 | No data | 856,000 | 400,000 | Clarksville Furnace | 47 | 0.70 | ... | 17.5 |
| Lawrence Iron Co. | Wright | 1894-1898 | 125 | 506,000 | 1,000,000 | Tenn. Coal, Iron & Railroad Co. | ... | ... | ... | ... |
| Rockdale Iron Co. | Gray | 1906-1912 | 9 | 100,000 | 50,000 | Rockdale Iron Co. | 49 | ... | ... | ... |
| Napier Iron Co. | Napier | 1870-1904 | No data | 500,000 | 200,000 | Napier Iron Co. | 50 | 0.50 | ... | ... |
| Bon Air Coal & Iron Co | Allen's Creek | 1891-1912 | No data | 1,019,776 | No data | Allen's Creek Furnace. | ... | ... | ... | ... |
| Napier Iron Works | Sharp | 1889-1912 | 10 | 400,000 | No data | Napier Iron Works | ... | ... | ... | ... |
| Individuals | ... | ... | 300 | 0 | 3,000,000 | | | | | |
| Total brown ore | | | | 4,622,276 | 160,545,000 | | | | | |
| *Spathite, Siderite, Limonite and Calcite Used as a Flux* | | | | | | | | | | |
| So. Tenn. Dev. & Mining Co. | Iron City | 1899-1900 | 100 | 10,000 | 2,000,000 | N. Ala. Furnace Co. | 20 | ... | ... | 10.00 |

## National Tube Company's Safety Calendar

The publicity department of the National Tube Company, Pittsburgh, has issued a Safety Calendar. About 30,000 have been printed for distribution to its employees. Different headings were used on the calendars. Those having a view of the Kewanee works at Kewanee, Ill., were sent to that plant; others with a picture of the National works at McKeesport, Pa., were sent to that plant; thus, all the works of the company were covered. The purpose is to keep the idea of "safety" in the foreground at all times. It is presumed that nearly all the employees will take the calendars to their homes, and, as it will be in plain sight for perhaps a year, the idea of "Safety First —Safety Always" will constantly impress them. The calendar starts with December, 1912, ending with that month in 1913, and there are 13 different mottoes at the bottom of as many calendar pads. These mottoes all have to do with the question of safety and are as follows:

The careless handling of materials in a steel mill produces more accidents than any other single cause. Remember this when you are moving or handling materials.

Every danger sign posted in the mill means that the danger pointed out is real. Men must ascertain what is on these signs around places where they work and give heed to the warnings. The Red Ball on a sign means Danger.

The company has spent large sums of money, as well as time and labor, for the prevention of accidents. All its employees are asked to assist in the work by using constant care to prevent accidents to themselves or others.

It is better to lose several minutes to avoid an accident, than to lose several months on account of an injury. "Get the Safety Habit." If you see a man acting carelessly, tell him about it, and don't be afraid of hurting his feelings by so doing.

It is a criminal violation of the law to give or receive money or anything of value in return for a job. The company will rigidly enforce this law.

A dirty mill means accidents. Do not leave waste material or refuse lying around. Places are provided for keeping it. Do your part toward keeping the mill clean.

Reports show that new employees and men engaging in new work are more likely to be injured than old employees. Remember this, and find out the special dangers to be avoided when starting on new work. Your foreman will tell you.

It is an important duty of every employee to look out for unsafe conditions, unsafe or defective tools and machinery, carelessness of other employees and the violation of rules, and immediately report such matters to his foreman.

The company is providing drinking water, lockers and wash rooms, with ample facilities, and keeping them in order. You are invited to use them freely, but do not abuse them or allow any one else to abuse them.

The majority of the accidents in the mill are due to some one's carelessness, and frequently to the carelessness of the man himself who is injured. Cultivate safety habits. The company does not want careless men in its employ.

Playing, wrestling or fooling on the mill premises, as well as

playing or fooling with machinery or tools, are strictly prohibited. Such conduct is exceedingly dangerous.

Never go on crane runways unless you have work on them and have first been provided with the proper protection. Crane runways and railroad tracks are always dangerous places.

Neglect of slight injuries often results in blood poisoning and serious trouble. The company has provided an emergency hospital, where employees injured in the mill can receive the best of attention. Don't neglect small injuries.

## Illinois Central's Co-operative Education Plan

The Illinois Central Railroad Company has introduced through its educational bureau the co-operative plan originally put into effect by Dean Schneider of the University of Cincinnati. The Illinois Central co-operative plan contemplates the use by the local high school of the facilities of the railroad shops wherever the railroad has sufficient facilities to offer. It extends to any such community the privilege of adopting its co-operative plan in the schools with the understanding that all the facilities which the Illinois Central has available there are at the service of the community.

The railroad company will accept as a student on this plan any public school scholar 16 years of age or over (in accordance with State laws) who shall be recommended by the superintendent of schools or by other proper school officer. There are few formalities connected with the plan. Two boys constitute a unit in the shop and the school. They alternate each day. It is up to each boy to keep up with his partner and his class in school. The boys are paid regular apprentice wages as follows: Twelve cents an hour for the first year; 13c. for the third six months; 15c. the fourth six months; 16c. the fifth six months; 17c. the sixth six months; 18c. the seventh six months, and 20c. the eighth six months. Reasonable credit will be given for previous shop work or manual training work.

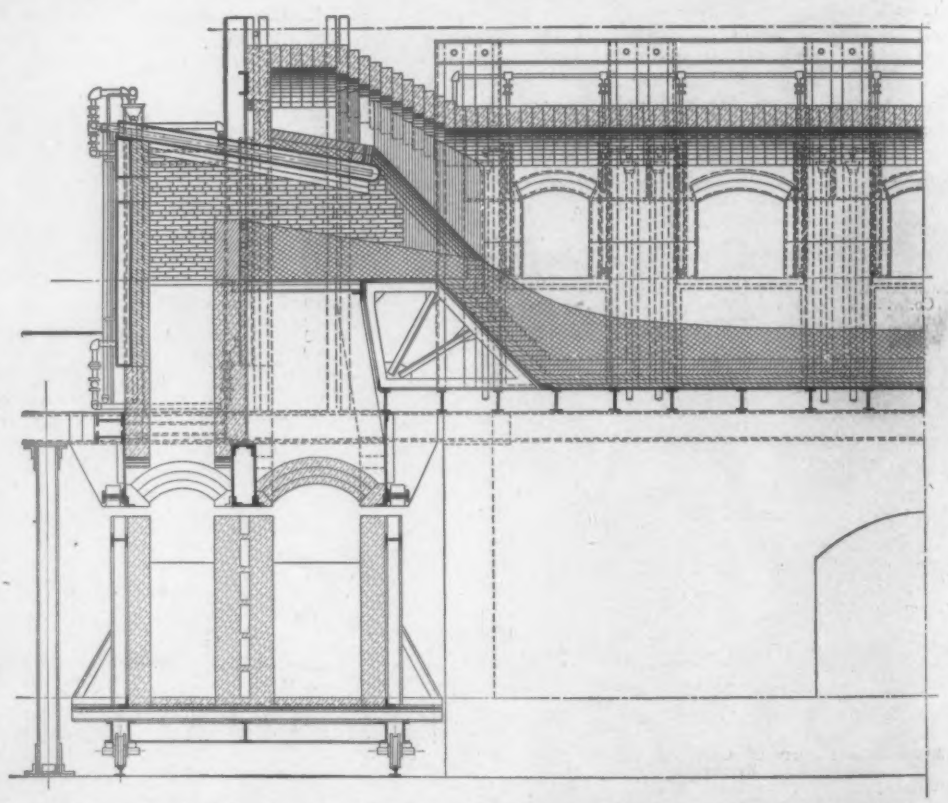
The regular four years' high school course, when taken on the co-operative plan, contemplates the student working in the shop in the summer months when school is not in session. The Illinois Central is ready to allow three years' time on the apprentice shop period of every high school student who graduates under this co-operative plan. Further information regarding the plan can be obtained from W. L. Park, vice-president and general manager of the Illinois Central Railroad, or of D. C. Buel, chief of the educational bureau.

Delaware River shipbuilders are extremely busy. The recent award of three torpedo boat destroyers to the Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia, and one to the New York Shipbuilding Company, Camden, N. J., adds to a previously large list of vessels to be constructed. The latter yard is now building a battleship for Argentina, a Pacific coast passenger steamer, a Chinese cruiser, several tank steamships, the battleship Oklahoma, a collier, a large river steamboat and a number of car floats. At the Cramp yard work is under way on five torpedo boat destroyers, a submarine, four Pacific coast passenger steamships and a number of other vessels. Activity is assured for all of next year.

## The Blair Patented Removable Slag Pocket

In the usual operation of an open-hearth furnace for the manufacture of steel, the resultant filling of the slag-pockets with slag necessitates periodically stopping the operation of the furnace for cleaning out these pockets. This cleaning is not only destructive of the brick-work of the pockets and expensive in that way, but the necessary interruption in production by the furnace augments the expense by the consequent loss of product. This expense is particularly heavy in the operation of basic furnaces. To meet the problem a slag-pocket structure as a removable portion or section of the furnace structure has been developed by the Blair Engineering Company, New York and Chicago, whereby it may be readily and relatively speaking, quickly removed when filled, and as readily replaced by an empty one. The accompanying drawings cover a longitudinal vertical section of one of the two similar ends of an open hearth furnace provided with this improvement and a sectional view of the furnace at one end. The drawings also show the furnace equipped with Blair Ports.

The slag-pocket structure consists, in its preferred form,



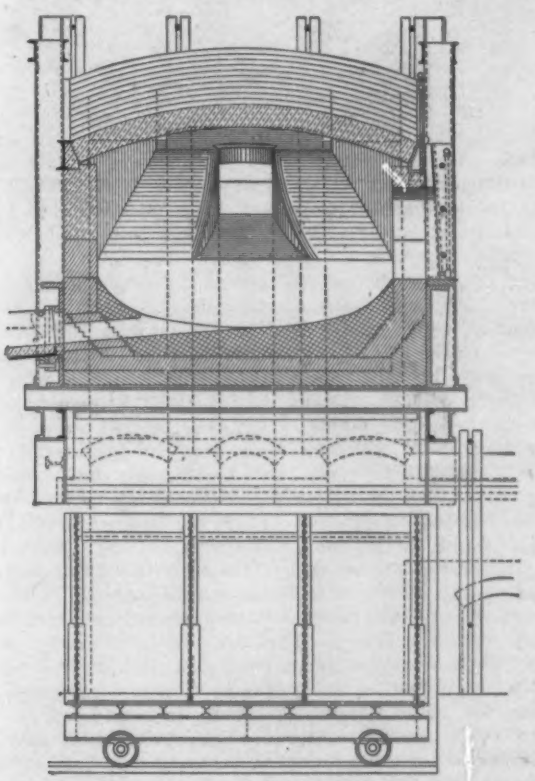
Sectional Elevation of 60-Ton Open Hearth Furnace With Blair Patent Ports, Showing Especially the Blair Removable Slag Pockets

of a wheeled carriage for convenient moving on a track provided in the proper position at each end of the furnace. It has metal posts, suitably braced, rising at intervals from the carriage-bed to provide a frame-work for the brick walls forming the slag-pockets. The lower ends of the port down-takes are provided with suitable metal binding for supporting the slag-pocket arches at the lower ends of the down-takes, whereby these arches are separate from the slag-pocket walls and not dependent on them for support. The dimensions of the structure are such as to adapt it to fit under the down-takes of the flues, registering its pockets therewith to receive the slag produced in the operation of the furnace and filling out the structure of the latter as when the slag-pockets are formed integral therewith in the usual way.

On placing a slag-pocket carriage in position a narrow opening is left between the top of the pocket-walls and the down-take walls and a similar opening between the wall of the flue leading to the regenerative chambers and the adjacent wall of the pocket-structure. These spaces are then temporarily closed by bricking them up, as represented, to form tight joints connecting the slag-pockets with the port down-takes and with the regenerative chambers. When the slag-pockets are filled, the bricks are

knocked in to destroy the bond between the carriage walls and the permanent furnace-walls, and without disturbing any other part of the furnace-structure, the slag-pot carriage is withdrawn to be replaced by another, whereupon the spaces are again bricked up. The joint in the walls may be made by placing a layer of ganister on top of the slag-pocket walls and shoving this whole box up tight against the upper portions of the walls by means of four screws at the corners of the carriage, blocking it in position by means of wedges or supports at the bottom of the carriage. In this case, where the amount of the lift is so small—say an inch or two—and where the operation occurs only once in two or three months, the screws are simpler and better than a hydraulic ram for the purpose. This would make the operation similar to putting the bottom on a Bessemer converter.

Instead of requiring in time, for effecting the removal of the slag and rebuilding the slag-pockets and downtakes, as heretofore, from a week to ten days, with the attendant loss of the product of the furnace and that due to the expenditure of a very considerable amount of labor and fuel to bring the furnaces back to melting temperature, the whole operation of removing the slag and restoring the



Sectional Elevation of Open Hearth Furnace, Showing the Blair Removable Slag Pockets

slag-pocket equipment in a furnace in accordance with this improvement may, it is stated, be accomplished in a few hours, thus enabling a large portion of the heat of the furnace to be retained, so that the furnace may be gotten back to normal working conditions with very little delay and expenditure of labor and fuel.

---

**Lifting Magnets.**—The development in lifting magnets has been summarized by the Cutler-Hammer Clutch Company, Milwaukee, Wis., which now claims the record that not a single ground or short circuit has been found in standard Cutler-Hammer lifting magnets in a period of over three years. The status of the development is indicated in the fact that a magnet has been sold for underwater service to the Vancouver Salvage & Dredging Company, Vancouver, B. C., that a 24-in. magnet provided with special pole shoes has been put on the market to handle an 8000-lb. skull cracker ball, having ten times the weight of the magnet, and that an 18-in. magnet has been made. The company reports that the demand for special types of rectangular magnets has shown a marked increase as magnetic lifting has been applied to various new uses in industrial plants.

## A New Flask for Dry Sand Molding

The accompanying view shows a flask equipment which was developed at the foundry of the Hardie-Tynes Mfg. Company, Birmingham, Ala. It was described by A. E. McClintock, commissioner of the National Founders' Association, before the recent meeting of that body and from him the following notes have been obtained:

Flask Used by the Hardie-Tynes Mfg. Company, Birmingham, Ala.

The flask is designed for use on the jarring machine and for dry sand molding. Its advantages are: The flask is entirely self-contained and is never unbolted, but remains together all the time. Instead of using solid cast iron plates for the top and bottom, a stiff grating has been bolted directly to the flask. This enables the flask to be filled with sand and jolted without the bother of hunting up a solid plate and fastening it each time. Another great advantage is that there are no bars in either the cope or the drag, the sand being held in place by what is known as a lifting plate or a joint plate. This joint plate partakes of the nature of a stripping plate, except that there is about 1 in. of sand between the edge of the plate and the pattern. These lifting plates are very quickly and cheaply made to fit any job that may be put in the flask. It has been found that three or four sizes of the same pattern may be molded with the use of the same plate by simply making the plate for the largest pattern and by laying a few rods across the extra opening; when the small pattern is used the sand will be carried with safety. The adoption of this type of flask enabled this firm to dispense with fully 50 per cent. of its flask equipment.

---

The Lea-Courtenay Company has been incorporated under the laws of New York with a capital stock of $50,000. It takes the engineering and manufacturing business of Albert G. Lea of New York, who has turned over all unfinished contracts to the corporation. Its office is at 90 West street, New York. It will manufacture high-duty turbine pumping machinery for all classes of service and will also have a department for the manufacture of cold metal sawing machinery. Albert G. Lea is president; Courtenay R. Rothwell, vice-president and general manager; Edgar W. Heller, treasurer.

---

The National Railway Appliances Association, Ellsworth Building, Chicago, is distributing a list of those who have taken space at its coming exhibition in the Coliseum and First Regiment Armory, Chicago. The list comprises 142 names, thus indicating that the display will be unusually large and comprehensive. Although the exhibition will not open for three months, the space available has practically been taken. Installation of exhibits will begin March 12, and the exhibition will open March 15, closing on the night of March 21.

---

The Ogden Iron & Steel Mfg. Company, Bayonne, N. J., has been reorganized, changing its title to the Bayonne Bolt & Nut Company. Owing to its increased demand for nuts and bolts the company will devote its entire plant to the manufacture of the products of that department, including bolts, nuts, tie rods, lag screws, etc. By the reorganization J. Edward Ogden disposes of his interest to Henry and J. R. Steers. The offices of the company will hereafter be at the works, Second street and Trask avenue, Bayonne.

# High Speed Sensitive Drilling Machine

**Power Feed Mechanism Contains Several Interesting Mechanical Features**

The ball bearing multi-spindle sensitive drilling machine, shown in accompanying illustrations, is a new type brought out by the Washburn shops of the Worcester Polytechnic Institute, Worcester, Mass., which possesses several new features, notable among which is the power feed mechanism, details of which are seen in Fig. 2.

The friction is of the well known cone type. The female member 2, Fig. 2, is driven by a worm on the rod 1, the male member 3 being keyed to the driving shaft 18, which in turn is keyed to the pinion 14, this pinion being in mesh with the rack sleeve 8, which carries the spindle. The drill is brought forward to the work in exactly the same manner as in the ordinary hand feed sensitive drilling machine. The instant the drill meets with the resistance of the work, a slightly further pull on the hand lever 9 forces the spring plunger 20 over a cam shoulder in the pinion 19 and permits the lever block 13 to advance on the thread, this lever block being threaded to the quill pinion 19. As the lever block advances on its thread, it pushes against the shoulder head on the shaft 18, forcing it longitudinally, thus engaging the members of the friction, and feeding the drill. The amount of advance of the lever block along its thread is fixed, the spring plunger 20 coming against a positive stop in the pinion 19.

The release is accomplished in exactly the same way, for any resistance to the turning of the lever block unscrews it on its thread, carrying it back to the original position. The plate 15, attached to the lever block 13, forces back the shaft 18 and thus positively disengages the friction. The instant the friction is released the drill is returned automatically to its original position by the coil spring 12, one end of which is fastened to the lever block and the other to the head bracket. The coil spring is in a case cast as a part of the head bracket. The depth of hole is regulated by the adjustable stop ring 11, which

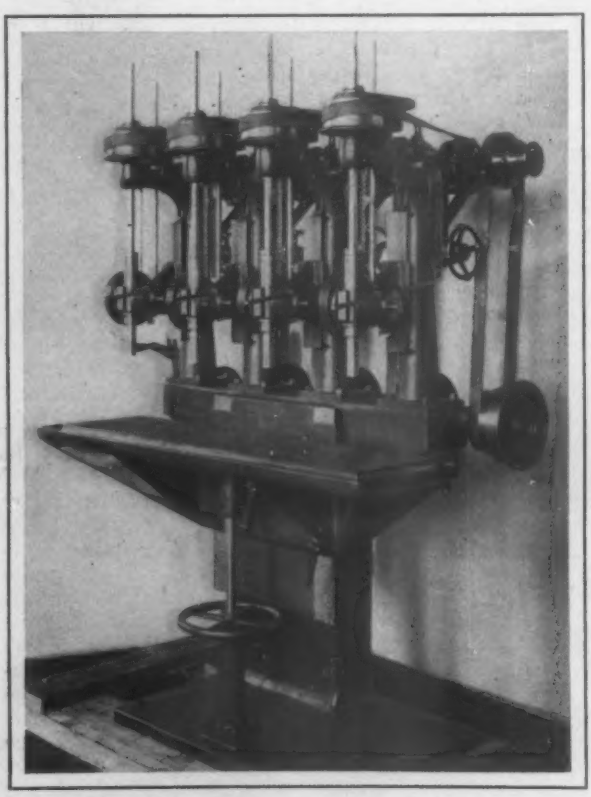


Fig. 1—The Washburn No. 2 High Speed Ball Bearing Sensitive Drilling Machine

is fastened in any position by the thumb screw 22, and is positive when the drill reaches the end of the run, tripping automatically, whether the ring is set or not.

For hand feed the knob 16 is pulled out causing the key 14 to lock the pinion and lever block. As the keyway in the pinion registers only when the lever block is in its highest position, this locking cannot take place when the power feed is in operation. The bite of the friction is adjustable.

The three feeds are approximately .0075, .010, and .015 per revolution, the changes being made by the star wheel shown near the spindle pulley, which turns a pinion that moves a sliding key.

The machine is built with one, two, three, four or six

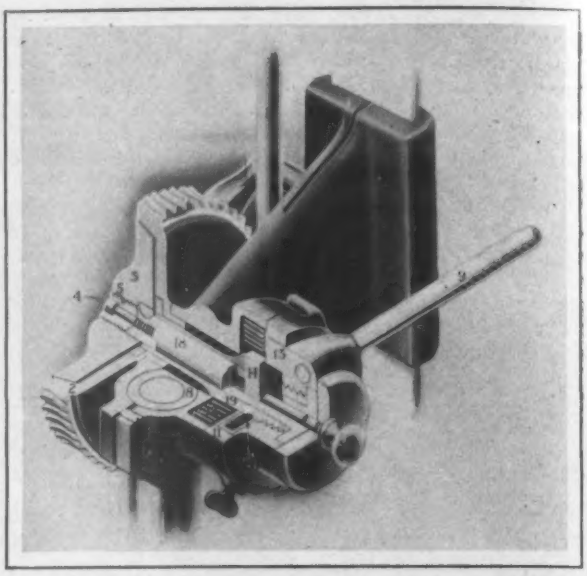


Fig. 2—Details of the Power Feed of the Washburn High Speed Drilling Machine

spindles. The belt tensions are controlled by automatically locked tighteners operated through rack and pinion, by means of which any desired tension may be obtained instantly, or the belt of any spindle loosened so that it hangs free from the back cone pulley. Thus a spindle may remain idle without stopping the machine. The pull of the belt on the spindle pulley is taken on the drill post. A retaining ring is cast concentric with the bearing of the spindle pulley, forming a basin which holds the oil, flooding the bearing continuously and preventing spatter. The table is raised by hand wheel and coarse pitch screw, the weight being carried on a ball thrust bearing. The table bearing on the column is 16 in. wide on the three spindle machine and 20 in. on the four spindle and 1½ in. deep. The table is fixed in position by clamp handles within easy reach of the operator. The machine is furnished with either hand or power feed. The specifications follow:

Taper in spindle, No. 2 Morse: Travel of spindle for power feed, 4 in.; travel of spindle in hand feed, 5 in.; diameter of spindle in sleeve, 1 in.; diameter of spindle pulley, 6 in.; width of driving belt, 1½ in.; vertical adjustment of head, 8½ in.; vertical adjustment of table, 14 in.; distance, post to center of spindle, 6⅝ in.; distance, column to center of spindle, 6 in.; swing in gap, 16 in.; range of spindle distances from table, 0-22 in.; backshaft at 610 r.p.m. gives spindle speeds 610, 1016, 1830 r.p.m.; weight, one spindle, 550 lb.; two spindles, 1100 lb.; three spindles, 1600 lb.; four spindles, 2000 lb.

---

The Unit Construction Company, Liggett Building, St. Louis, Mo., has acquired the interest and good will of Ernest L. Ransome and the Ransome Engineering Company in patents covering the Ransome unit system of reinforced concrete construction. This arrangement adds to the company's method of Unit-Bilt construction the benefits to be derived from the experience of the Ransome organization. E. L. Ransome will co-operate with the engineering department as consulting engineer.

---

In connection with the description of the Eagle Claw wrench, page 1333 of *The Iron Age* of December 5, it should have been stated that Ambler, Holman & Co., 565 West Washington street, Chicago, are exclusive distributers of this wrench for Canada and the United States, rather than manufacturers.

## Piece-Work and the Race Problem

Many advantages have been found to follow the adoption of the piece-work system in iron and metal-working establishments, among them being a lower cost of production, a greater output with the same equipment and better returns for the men themselves. In view of the fact that the labor expense attached to the production of goods is definitely known when this system is used, it is obvious that its benefits are by no means limited. An unusual and perhaps suggestive advantage of the plan, as developed by a manufacturing establishment in an Ohio Valley city, indicates that the good points of the piece-work system have by no means been exhausted by the list just outlined. In this particular factory it solved what is always a more or less difficult problem.

This concern makes a combined wood and metal product used in the manufacture of vehicles. In the woodworking department white men are employed altogether, because the work requires a considerable degree of judgment, and they have been found best suited to it; but in the ironworking section of the shop negroes have been used with general satisfaction. In some parts of this department, too, white men are employed, operating machines alongside of negroes.

The operations of the latter shop consist of cutting bar iron to length, putting it under a trip hammer and flattening it to the required dimensions, welding the ends together and then applying the finished product to the wood. For work at the shears, hammer and welding furnace black helpers have been found satisfactory, and consequently are employed regularly at this class of work.

Obviously, however, there is always room for friction to develop in a plant where the races are mixed, especially when this happens to be in a shop south of Mason and Dixon's line, where racial antipathy between the white and black portions of the population is generally supposed to be strong. Incidentally, it may be mentioned that this antipathy is less in evidence than some of the writers of books would have the public believe.

In this particular plant, whatever trouble might have arisen through the conflict between the two races or because of any fancied degradation resulting from whites and blacks working at the same tasks was anticipated by the simple plan of paying the men by the piece. Everybody handling an ironworking tool is paid according to his production. This is the only part of the plant in which piecework can be used to advantage, the woodworking section being required to handle such a large variety of material and under such varying conditions that it has not been thought worth while to attempt to evolve a schedule sufficiently elaborate and exact to be of value or economical. But in the ironworking processes the tasks are standardized to the extent that only two or three sizes of the product are turned out. The same kind of work is done continuously, and figuring earnings under the piece-work plan is exceedingly simple, a record being made at the end of each day by the foreman as to the output of each machine. In some cases where more than one man is employed in connection with a machine, as for instance at the hammer, where two helpers are used in addition to the operator of the tool, each has a share in the payments made for the product of the machine.

In practice the plan has worked beautifully, not only as far as holding down operating expenses is concerned, but also as to eliminating possible friction between the white and negro employees. Every man has an opportunity to demonstrate his superiority as a worker by turning out more than the average and thus to increase his earnings above those of his fellows. And since the white man need not feel that he has been reduced to the level of the negro by being put on the same footing with him as to wages, there is no reason for him to be offended because workmen with dark skins happen to be employed in the same department with him.

"We have not had any trouble because we mix the two races in our shop," said the superintendent recently, discussing this feature of the operation of the plant, "and, furthermore, I do not believe there is any chance for trouble to develop. In the first place, everybody is so busy trying to keep his production up that he doesn't stop to worry over the possibility of his social status being confused because of the color of the man next to him. In the second, the men we have are veterans in their special tasks and know each other personally, something which usually prevents ill-feeling from developing, as it might do if a number of negroes were suddenly put to work in a shop formerly employing white men only."

It is worthy of remark that negroes have been found especially valuable in the Southern iron trade in a number of pursuits. While they are not likely to make good machinists nor to be of value in the operation of tools requiring a great amount of technical skill or judgment, they are quick to learn comparatively simple processes, and can develop great speed in turning out their work. In stove foundries, for instance, where the piece-work system is also employed to advantage, they have been taught to handle castings with marked facility, and are reported to be first-class employees in every respect. Here again, however, the manufacturer turns to white labor in the nickeling and machining of his product, so as to get the proper finish and appearance of each piece.

---

## Large Orders for Mesta Gas Engines

The Mesta Machine Company, Pittsburgh, has received two orders for gas engines which present features not usually encountered in this class of work.

The first order calls for three single tandem, horizontal, double-acting, four-cycle engines, having cylinders 28 in. diameter by 36 in. stroke, to operate at a speed of 150 r.p.m., each arranged to drive direct-connected a 600-k.w., 60-cycle, 3-phase, 600-volt, alternating current generator. These engines are to be installed by the Canadian Car & Foundry Company in its new plant at Fort William, Ontario, and will form the largest producer gas engine plant in Canada. The main gas plant consists of four double bituminous coal generator sets furnished by R. D. Wood & Co., Philadelphia, Pa. This plant was originally intended for fuel gas purposes, but, as it is necessary to intermittently change from the water gas operation to producer gas, it was decided to utilize the waste or producer gas for power purposes. This gas will contain approximately 100 effective B.t.u. per cu. ft. and will not contain more than 10 per cent. hydrogen by volume, and is particularly suitable for use in gas engines.

The fuel gas, which will be used for furnace work, will have a heat value of 300 B.t.u. per cu. ft. and will contain 50 per cent. H and 50 per cent. CO. The operation of the producers will be such that it will be practically impossible to mix the two gases; that is to say, the regulation of the gas will be automatic, eliminating any liability of water gas being carried to the engines. In the use of double generator sets, the gas is drawn off the top of one generator and down through the incandescent mass of the other, the tar being consumed and converted into gas, thereby increasing the efficiency of the plant. Soot will be the resulting deposit, and it will be disposed of through Theissen washers.

The other order comprises three engines of exactly the same size for the Alpha Portland Cement Company, Easton, Pa. The engines will be located at Cementon, N. Y., near Catskill, and will operate in parallel with four producer gas engines now in service. Gas is generated through R. D. Wood & Co.'s superimposed pressure type producers using bituminous coal as fuel.

---

The Youngstown Sheet & Tube Company, Youngstown, Ohio, announces to the holders of its common stock that $1,500,000 of preferred stock is offered to them pro rata at $100 per share, or par value. The proceeds of this final sale of the remaining unissued portion of the $5,000,000 of preferred stock will be used for increasing the working capital, and also for the purpose of paying for large additions to the plant now under way, including a fourth blast furnace, an open-hearth steel plant, etc. Fifty per cent. is payable April 1 and the other 50 per cent. October 1, 1913.

---

The Pennsylvania Steel Company, which recently blew in its No. 1 furnace at North Lebanon, Pa., will operate it on basic pig iron, using practically all Cuban ore, supplied from properties in which it is interested.

# Cementation of Steel by the Use of Gases

## Results of Experiments with Carbon Monoxide, Methane with Ammonia Gas and Illuminating Gas

In Stahl and Eisen for October 24, 1912, is an interesting discussion by Franz Kurek, of the Royal Technical High School at Berlin of "Cementation of Iron by Means of Gases." The author states that lately various attempts have been made to raise the carbon in steel by gases at various temperatures and cites among other cases the experiments of Olsen and Weiffenbach of the Polytechnical School at Brooklyn, N. Y., in which various laboratory trials were made to determine the influence of gases on iron. These attempts were more or less unsatisfactory, since a temperature no higher than 815 deg. C. was used and the whole was carried out under artificial pressure. It was demonstrated that carbon monoxide possessed the greatest carbonizing property under these conditions, and was not aided by the simultaneous use of ammonia gas ($NH_3$), while the carbonizing properties of illuminating gas, acetylene ($C_2H_2$) and methane ($CH_4$) were not especially enhanced by the addition of ammonia gas, or nitrogen in the form of ammonia gas. The author states that there must have been unavoidable errors in these experiments, since the gases as used were not dried, whereas in his investigation all traces of moisture were removed.

The author's experiments were made with rods of soft steel, 10 mm. in diameter and 100 mm. long, and of the following composition: C, 0.091; Mn, 0.32; Si, 0.026; S, 0.035; P, 0.040. They were completely machined to remove all scale, etc. Carbon monoxide gas was produced from formic acid and sulphuric acid, the oxygen and carbon dioxide carefully removed and the gas dried by means of oxide of lime. The cementation experiments were carried out in a glazed porcelain tube heated in a horizontal electric platinum resistance oven, and the temperatures regulated and registered by means of Le Chatelier pyrometers. From each rod, layers or sections of 2/10-mm. thickness were turned off and analyzed for their carbon and nitrogen content.

### Effect of Carbon Monoxide

The results of the experiments with carbon monoxide gas, under the conditions mentioned above, are given as follows:

*Table 1—Cementation with CO*

| No. | Temp. | Time | Carbon in the layers 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 2 | 800 deg. C. | 8 hr. | 0.67 | 0.32 | 0.28 | 0.21 |
| 3 | 900 deg. C. | 4 hr. | 0.55 | 0.36 | 0.27 | 0.25 |
| 4 | 1000 deg. C. | 4 hr. | 0.41 | 0.31 | 0.21 | 0.18 |
| 5 | 1000 deg. C. | 8 hr. | 0.46 | 0.36 | 0.36 | 0.29 |
| 6 | 1100 deg. C. | 8 hr. | 0.28 | 0.28 | 0.20 | 0.22 |
| 7 | 700 deg. C. | 4 hr. | 0.15 | .... | .... | .... |
| 8 | 600 deg. C. | 4 hr. | 0.15 | .... | .... | .... |

From this table it is evident that at 800 deg. C. the outer layer of the test piece shows the greatest absorption of carbon, which diminishes very quickly toward the inside. In the tests made at higher temperatures the percentage of carbon on the outside is not so high, but the entire piece is enriched with carbon. The acceleration of the diffusion of the carbide also increases with the temperature. This diffusibility is greater at higher temperatures than the reaction between iron and carbon monoxide. The conclusion therefore is that at lower temperatures the percentage of carbon is greater on the outside than at higher temperatures. This is borne out by the metallographic examinations. The treated steel, of course showed very little pearlite, as can be seen in the unaffected part of Fig. 1, which shows a thin pearlitic ring on the edge of the test piece. In Fig. 2 this ring of pearlite is a little wider, while in Figs. 3 and 4 the pearlite penetrates to the middle of the test piece, showing at the same time an enlargement of the ferrite crystals, due to the high temperatures.

From these experiments it is deduced that under normal atmospheric pressure carbon monoxide gas alone is not advantageous for cementation use, since the carbonization between 800 and 900 deg. C. takes place too slowly and the rim does not reach the percentage of carbon of the eutectic, i. e., 0.90, which is usually necessary. Then also there ensues at this temperature so sharp a dividing line between the carbonized layers and the non-carbonized core that in any case a flaking off must result. This can be lessened and more or less overcome by heating the pieces at 800 deg. C. and then a longer time at 1000 deg. C.

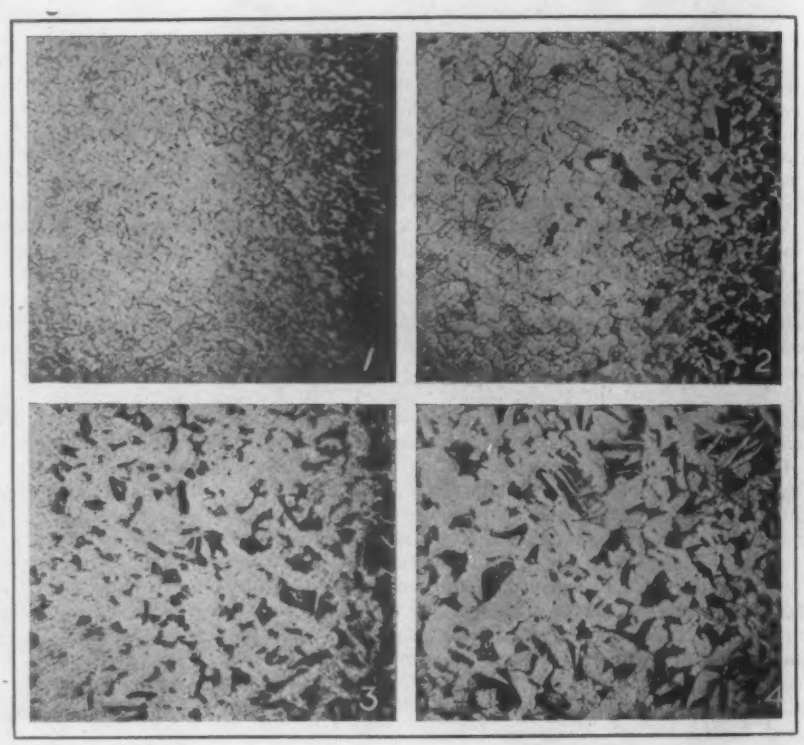


Fig. 1—Heated 4 Hr. in 800 Deg. C. in CO Gas
Fig. 2—Heated 4 Hr. at 900 Deg. C. in CO Gas
Fig. 3—Heated 4 Hr. at 1000 Deg. C. in CO Gas
Fig. 4—Heated 4 Hr. at 1100 Deg. C. in CO Gas

It is claimed that when cementation is carried out by means of solid carbon compounds, it is carbon monoxide gas that really does the work, while others insist that carbon in actual contact with steel can produce carburization. Since this condition cannot obtain, because layers of air must intervene in any case, it must be assumed that some gas is an important and essential factor. The author here elaborates on some experiments by which he attempts to show that at certain temperatures, in a vacuum, cementation by means of carbon monoxide takes place, but at a very much less extent than in the air, showing that some other gas is an important factor.

The author continues his experiments by using carbon monoxide mixed with 2.25 vol. per cent. of ammonia gas, and also 6.36 vol. per cent. under the same conditions as the experiments with carbon monoxide alone. Without reproducing his tables and photomicrographs, his conclusion may be given, viz., that the carburization was not favorably influenced over that obtained by carbon monoxide alone, yet the steel was essentially increased as

to hardness. Carbon was absorbed at 800, 900 or 1000 deg. C., and also a correspondingly greater percentage of nitrogen.

### Effect of Methane

The same experiments were then carried out using methane alone, with the following results:

*Table 2—Influence of Methane*

| No. | Temp. | Per cent of C in layers 1 | 2 | 3 | 4 | Inc. in weight |
|---|---|---|---|---|---|---|
| .. | 800 deg. C. | No effect | | | | ..... |
| 21 | 900 deg. C. | 1.31 | .93 | .74 | .45 | 0.1344 gram. |
| 22 | 1000 deg. C. | 1.81 | 1.41 | 1.26 | .55 | 0.3420 gram. |

From this is seen that at 800 deg. C. no carbon is absorbed, while at 900 and 1000 deg. C. there is a decided carbonization and the outer layers show high carbon content. Contrary to the case of carbon monoxide gas, the disassociation of methane at these temperatures is greater than the rate of diffusion of the carbon, so that the outer layers are more highly carbonized. Here also the percentage of carbon toward the center diminishes quickly, as the almost carbonless core in Fig. 5 plainly demonstrates. The same experiment carried out with methane mixed with 2.25 per cent. and 6.36 per cent. ammonia gas by volume resulted as follows:

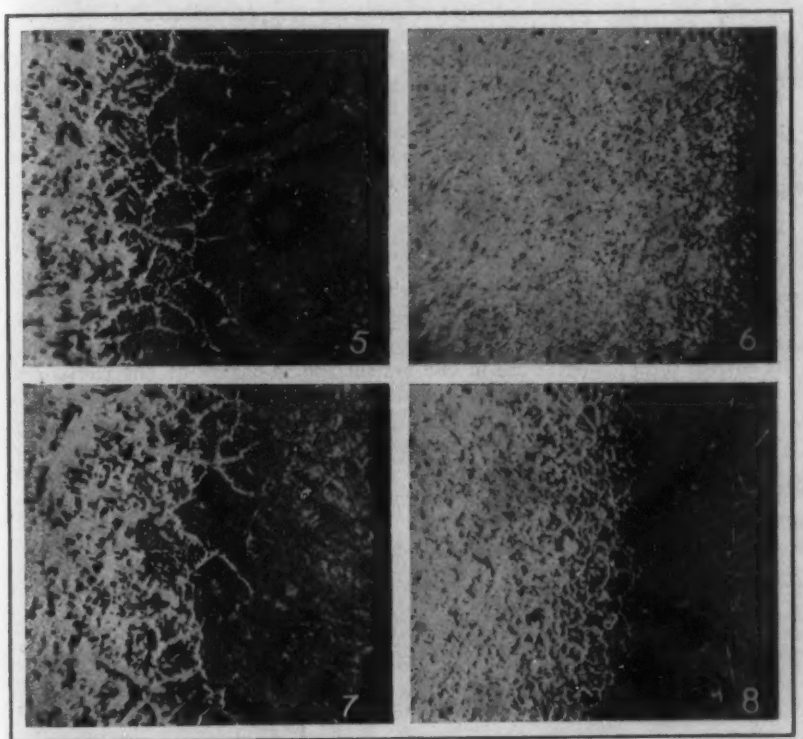


Fig. 5—Heated 4 Hr. at 900 Deg. C. in Methane

Fig. 6—Heated 4 Hr. at 800 Deg. C. in Illuminating Gas

Fig. 7—Heated 4 Hr. at 900 Deg. C. in Illuminating Gas

Fig. 8—Heated 4 Hr. at 1000 Deg. C. in Illuminating Gas

*Table 3—Influence of Methane Plus 2.25 Vol. Per Cent $NH_3$*

| No. | Temp. | Per cent of C. 1 | 2 | 3 | 4 | Per cent of N. in layers 1 | 2 | 3 | 4 | Inc. in weight |
|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 800 deg. C. | .30 | .32 | .17 | .10 | .61 | .24 | .13 | .091 | .0494 g. |
| 24 | 900 deg. C. | 1.01 | .67 | .47 | .37 | .12 | .094 | .066 | .057 | .1013 g. |

*Table 4—Influence of Methane Plus 6.36 Vol. Per Cent $NH_3$*

| No. | Temp. | Per cent of C. 1 | 2 | 3 | 4 | Per cent of N. in layers 1 | 2 | 3 | 4 | Inc. in weight |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 800 deg. C. | .35 | .33 | .15 | .095 | .69 | .49 | .10 | .071 | .0614 g. |
| 26 | 900 deg. C. | 1.10 | .79 | .47 | .38 | .27 | .18 | .12 | .083 | .1109 g. |
| 27 | 1000 deg. C. | 1.58 | 1.35 | 1.06 | .96 | .23 | .16 | .11 | .100 | .3188 g. |

A mild carbonization takes place at 800 deg. C., but the carbon extends only 8 mm. into the steel. At the higher temperatures the carbon content does not reach the percentage attained when methane alone is used, the presence of a larger amount of hydrogen preventing so great a carbonizing influence.

### Effect of Illuminating Gas

Turning to illuminating gas, experiments carried out by means of this gas alone showed the following results:

*Table 5—Influence of Illuminating Gas*

| No. | Temp. | Per cent of C. in layers 1 | 2 | 3 | 4 | Inc. in weight |
|---|---|---|---|---|---|---|
| 28 | 800 deg. C. | .93 | .35 | .16 | .13 | .0516 gram. |
| 29 | 900 deg. C. | 1.45 | 1.10 | .79 | .48 | .1695 gram. |
| 30 | 1000 deg. C. | 2.18 | 1.37 | 1.19 | .95 | .3251 gram. |

The composition of the gas used was:

| | |
|---|---|
| CO | 9.7 per cent |
| $H_2$ | 51.7 per cent |
| $CH_4$ | 30.7 per cent |
| Hydro-carbons | 2.8 per cent |
| $O_2$ | 0.3 per cent |
| $CO_2$ | 1.7 per cent |
| N | 3.3 per cent |

Carbonization at 800 deg. C. is greater than in the case of methane, which causes no cementation at all at this heat. While the carbonized area is very thin at 800 or 900 deg. C. as Figs. 6 and 7 show, at 1000 deg. the carbon has penetrated the entire piece, as Fig. 8, a lower diameter section, will show. Addition of ammonia gas to illuminating gas has an effect similar to that in the experiments with methane—a lower corresponding carbon content resulting as follows:

*Table 6—Influence of Illuminating Gas Plus 2.25 Per Cent Vol. $NH_3$*

| No. | Temp. | Per cent of C. in various layers 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 31 | 800 deg. C. | .66 | .32 | .22 | .12 |
| 32 | 900 deg. C. | 1.06 | .79 | .63 | .37 |
| 33 | 1000 deg. C. | 1.49 | 1.37 | 1.16 | 1.01 |

*Table 7—Influence of Illuminating Gas Plus 6.36 Per Cent. Vol. $NH_3$*

| No. | Temp. | Per cent of C. in various layers 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 34 | 800 deg. C. | .76 | .55 | .33 | .33 |
| 35 | 900 deg. C. | 1.17 | .76 | .59 | .38 |

Investigations as to the hardness resulting from these various experiments revealed the fact that the presence of ammonia gas increased the hardness and that the lower the carbon content the higher the nitrogen content at a given degree of hardness.

E. P. C.

---

To provide additional space and facilities to meet the growing demand for its Hard Service line of portable electrically operated drills and reamers, the Van Dorn & Dutton Company, Cleveland, Ohio, has disposed of its electric department in which it produced armature field and induction motor coils for railroad and mill service to the Cleveland Coil & Mfg. Company, Cleveland. The space thus rendered available has enabled the company to add materially to the capacity of its portable tool department, increased facilities being provided in the machine shop and in the assembling and engineering departments.

---

The Deforest Sheet & Tin Plate Company and the Standard Boiler & Plate Iron Company, both of Niles, Ohio, have decided to come under the provisions of the workmen's compensation law of Ohio. It is stated that they made a thorough investigation of the provisions and workings of this law and also received reports from other concerns that had come under the plan that results were satisfactory.

---

The Harlem Young Men's Christian Association, 5 West 125th street, New York, announces, for the fourth season, a course in heating and ventilating. It will last 22 weeks and is designed especially for engineers, draftsmen, mechanics and salesmen of heating and ventilating appliances, to whom a moderate fee will be charged. The course consists of lectures, demonstrations of systems, appliances, discussions and observation tours. It opens on the evening of January 9, 1913.

---

The Gogebic Steel Company is the corporate name under which the steel plant at Hammond, Ind., projected by Ferdinand Schlesinger of Milwaukee, will be built. The preliminary authorized capital stock is $500,000 and the directors are Ferdinand Schlesinger, H. J. Schlesinger, C. N. Turner, Herbert H. Springford and E. G. Wilmer. The articles of incorporation provide for the manufacture of steel, iron, other metals and coke.

# Production System for a 200-Employee Plant*

## Methods Evolved to Minimize Clerical Work in an Establishment Having Foundry and Machine Shop Operations

BY STUART DEAN

Money is made at the points of the cutting tools, and not at the points of the lead pencils. There is nothing quite so sad as a factory that has a clerical force out of proportion to the manufacturing force. Each producer must work the harder to support the parasite.

Beware of too much red tape. Avoid safe-guarding systems carried too far into details. Over-intricate cost-keeping systems do not pay as well as approximate systems. Many offices have shelves filled with time cards that cost hundreds of dollars, but which are not bringing in one cent's worth of returns. Putting this money into machine tools, or into efficient managers and high class workmen would be more profitable.

Too much red tape will tie the hands of the foremen and the employees. Many firms have failed because an intricate system of safeguarding killed the freedom of action of the foremen. Different foremen arrive at success by using entirely different methods. It is native ability that makes the thing go, and any check on this is damaging.

### What Too Much System Did

In a certain plant an intricate shop system and cost-keeping system had been installed. The cards were most elaborate, and were printed in colors. All the foremen, even down to the straw-bosses spent a large part of their time at improvised desks, shuffling time slips and writing. At a large machine the writer timed the cutting speed. The machine was running at one-third of its correct speed, with a feed about one-half of what it should have been. The product of that machine, in fact, of the whole plant, was being turned out at one-sixth the correct speed. At the tool-room a crowd of men was killing time, likewise at the drinking fountain, and the tool grinding emery wheel. The only department in the plant that was running at all well was the foundry.

The foundry foreman was asked how it happened that he wasn't writing at a desk. He said, "When I took this job they handed me a book of instructions, explaining their systems. I took it home and studied it during all my spare time for two weeks and then gave it up as being too complicated to be practical. I turned it over to my assistant, and he and a high school graduate we hired tend to all the writing for the whole foundry. All I do is to have the assistant give me a sheet of paper each evening telling me how many castings are wanted on each pattern. I chalk the number on the pattern. It takes me about five minutes each day and I am then free the rest of the day to push the work through."

The concern afterward failed. It would have been better for it to have had no cost system, and to have set its selling prices at its competitors' prices and made the foremen increase the output of the men until the firm began to make money. The "golden mean" lies between the two extremes of too much system and not enough system.

### Conditions Which Demand a Routing System

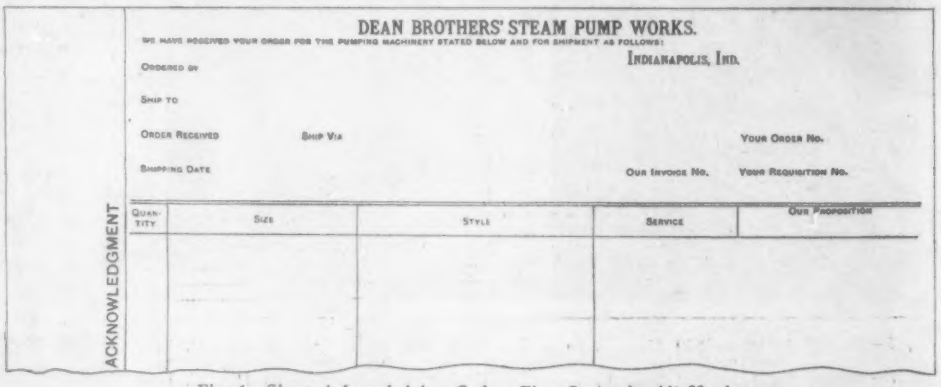
As a plant grows a time comes when the foremen will not be able to keep everything in their heads. A system then will have to be installed for keeping track of every piece going through the plant. Lack of some of the parts for a machine being built is one of the greatest drawbacks to the assembling department. The machine cannot be completely assembled until the last piece is received and all hand work is finished on it. Workmen, of necessity, loaf on the job when all the parts are not ready for them.

The routing of parts through the plant will have to be taken care of by some one who is given authority. It cannot be left to department foremen. The foremen's whole attention should be concentrated upon improving the methods and increasing the output per man of the shop.

Previous to installing the following system in a plant employing 200 men, the foremen kept track of everything in their heads. They developed wonderful memories. Finally the amount of work grew beyond the capacity of their memories. Parts that were started through the works were lost. Duplicate parts were made. The finished stock room gradually filled up with special odds and ends that could not be used. Eventually they were scrapped at great loss. Often the failure to order a certain piece on a machine was not discovered until the machine was about erected. The smooth, regular flow of the work through the machines had to be stopped to push this piece through. In the meantime the erector loafed on the job until he received the lacking piece. Then the system described below was introduced:

### System for Cost Keeping and Shop Routing

Two important points in this system are: (1) The shop part of the cost-keeping and the shop routing of material are in one system and in charge of one clerk. (2) The system is simple and requires but a small amount of clerical work. The writing consists of the mere jotting down of a symbol, or the drawing of a line through a printed word, or putting a cross or other mark in a space. This allows the foremen and workmen to give their full time to production. The system keeps absolute track of every piece that is going through the shop, and never lets one piece lag behind the others.



DEAN BROTHERS' STEAM PUMP WORKS.

WE HAVE RECEIVED YOUR ORDER FOR THE PUMPING MACHINERY STATED BELOW AND FOR SHIPMENT AS FOLLOWS:

INDIANAPOLIS, IND.

ORDERED BY

SHIP TO

ORDER RECEIVED — SHIP VIA — YOUR ORDER NO.

SHIPPING DATE — OUR INVOICE NO. — YOUR REQUISITION NO.

ACKNOWLEDGMENT

| QUANTITY | SIZE | STYLE | SERVICE | OUR PROPOSITION |
|---|---|---|---|---|
| | | | | |

Fig. 1—Sheet Acknowledging Order, Five Copies in All Used.

When an order for a machine is received, a number of acknowledgment sheets (Fig. 1) are typewritten in the office. One copy goes immediately to the customer as the acknowledgment of the order. A second copy is filed in the office to be used as the invoice to the customer when his machine is shipped. The office can always asertain whether or not a customer's machine has been shipped by looking in this file. If the invoice sheet is there, the machine has not gone. If the sheet is not there, the machine has been shipped. A third copy of the acknowledgment goes to the drafting room; a fourth copy to the material routing clerk; the original sheet is sent to the superintendent.

The departments receiving these sheets file them alphabetically under the name of the customer. From this file the order can always be referred to if the customer's name is known. The office gives each order a consecutive number, known as the order number, which is eventually stamped on the finished machine to identify it.

*Copyright, 1912, by Stuart Dean. Tenth article on Shop and Foundry Management.

During the process of manufacture all orders for material, all machine orders, and the assembling order for this machine, are marked with this order number.

Besides making out these acknowledgment sheets the office also makes out a set of sheets called the order sheets (Fig. 2). With these sheets is made out a card which is a facsimile of the order sheets, which is called the erector's tag. Two order sheets go to the drafting room. The tag and one order sheet go to the material routing clerk, and the original lead pencil copy goes to the superintendent.

These order sheets are filed either by the order number or are kept in files that are sub-divided to represent the different departments of the plant. As the work proceeds the order is moved from one departmental division of the file to another. The sheet is always kept under the department that is holding the work back the most. For instance, it may be filed under drafting room if the need of a new drawing is holding the work on the order back, or it may be filed under the pattern shop if new patterns must be made.

The orders thus filed save considerable traveling from one department to another. By taking the file of orders into a department, all the work can be rushed that the department is holding back. One trip a day, or even one trip every other day, is sufficient to cover everything.

The order sheet gives complete information to any one familiar with the product of the firm. It has written on it: The date of the order; shipping date; the name and address of the firm to receive the machine; the consecutive order number; the combination number; the size and style of the machine; all the peculiar or particular notes necessary for getting out the machine.

Each machine as it is designed is given a design number, which is called the combination number. This starts with No. 1 and continues indefinitely.

Every time any change in design is made in a machine, even if it be only a change on the smallest piece on the machine, a new combination number is given to the machine. For instance, suppose our machine combination No. 15 should develop a certain weakness in some small part, say a little pin, and suppose our highest or last combination number was 800. This machine after the pin was changed would be given combination number 801, and would be built under 801 combination number until another change in design was made, when it would take on another combination number.

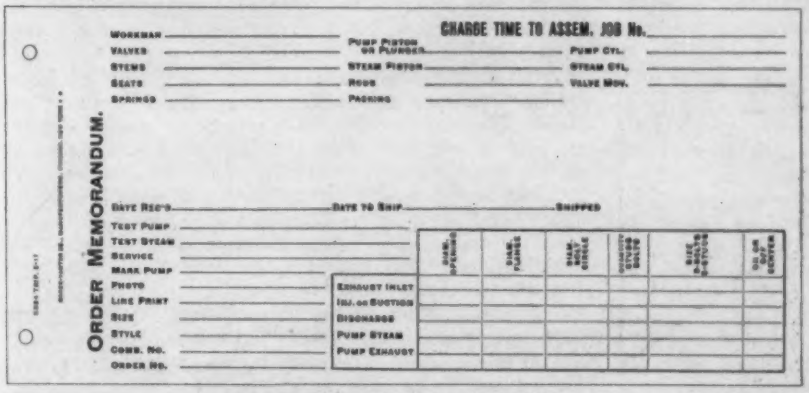



Fig. 2—Order Sheet. Size, 8¼x4½ In.

This is a fine system as it simplifies getting out repairs. A certain man does not have to be kept in the employ of a firm because he happens to remember how all the old machines were built. Another great thing about the system is the management is perfectly free to make all the improvements and changes in the design it pleases without in the least mixing anything or giving any further trouble.

The set of drawings for each size of machine is numbered with the combination number of the machine. Each drawing in the set is given a card number to separate it from the other drawings in the set or combination. Thus we would have for machine combination number 15 one set of drawings all marked "Combination No. 15" with the card numbers, if there were ten drawings in the lot running from one through ten.

After the change of the pin on combination No. 15, this machine would be called combination No. 801. All the combination No. 15 drawings would be used with the exception of the pin drawing No. 801, card 1.

### Bill of Material

The drafting room makes out a master bill of material for each design or combination of a machine, which is a complete record of everything on the machine. It gives a list, in columnar form, of each piece used on the machine. At the left of the name of each piece is given the combination number and card number of the drawing on which the piece is shown. At the right of the name of the piece is given the number of these pieces used on the machine, and the material. Material is signified by initials to save space. Still further to the right is a blank space for checking marks.

The bill of material is first made out by the drafting room in lead pencil on a large, specially ruled form, thus:

Size ..... Style ..... Comb. No. .....

| Drawing No. | Card No. | Name of Piece | No. Pieces | Material | Check |
|---|---|---|---|---|---|

This sheet is taken to office where a typewritten, exact copy is made of it on a sheet of transparent paper, using carbon paper turned wrong side up underneath. This prints typewriter ink on one side of the sheet and carbon on the other, the object being to make as opaque letters and numbers as possible, for blue-printing purposes.

This typewritten sheet is sent back to drafting room and a Vandyke, or brown copy of it is made in the same manner as blue printing. This brown print becomes the master copy. From this brown print a number of blue prints are made, the number depending on the popularity of that particular size machine. This print will have a white background and the rulings, numbers and wording will be in blue. The routing clerk can make check marks on it on the white background. All bills of material are of a standard size so that they can be filed easily.

When the two duplicate order sheets are received by the drafting room one is filed for reference; the other is pasted on the bottom of the blue print bill of material and sent to the shop routing clerk.

To the shop routing clerk this sheet becomes what the train dispatcher's board is to the train dispatcher. On it he keeps track of all material ordered outside of the factory, all the rough material from one department to another in the factory, all casting orders, and all the machine orders. He can tell by a glance at the bill of material whether a drawing is to be made for a piece, whether material is to be ordered, or has been ordered, whether a pattern is to be made, or a casting is to be made or is in stock in the rough, whether a piece is being worked in the machine shop, or whether it is finished and in stock ready for the erecting. Thus he has complete and accurate control of all parts, and can rush the lagging ones.

Alterations made on the machine while building, all improper workmanship, flaws or any other notes are inserted on the bill of material. These are useful for future reference should trouble arise from these faults.

The test card made out by the testing department is also pasted on this bill of material.

After the machine has been shipped the bill of material goes to the office and becomes the basis on which the cost is figured for the machine. The bill of material is finally filed away as the complete record of the machine, and in after years is used to make out repair part orders for the machine, should any repairs be needed.

### The Shop Material Routing Clerk

As soon as the shop routing clerk receives a bill of material for a machine to be built, he sends it to the finished stores department. For each piece they find that they have in stock they stamp their check mark opposite the name of that piece. This is a "Finished Condition" mark.

The bill of material is then sent to the rough stores department. The rough stores clerk stamps opposite the names of those parts that he has in the rough his "rough parts in stock" stamp.

It then is sent back to the shop routing clerk. He looks over it and orders the material for those parts that are not

PRODUCTION LIST.

| COMB. | CARD | NAME OF PARTS | QUANT. | MATERIAL | CHECK | COMB. | CARD | NAME OF PARTS | QUANT. | MATERIAL | CHECK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Fig. 3—Bill of Material: Size 10⅝x8⅞ In.

checked, that is, that are still blank. As fast as he writes out the orders for material he makes opposite the name of the piece his own check mark in lead pencil. He uses a different mark for material ordered outside the shop than is used for that ordered in the shop. He looks down the numbers at the left of the names of the pieces, the numbers representing the drawings for the pieces. Any number higher than the last drawing made he checks with a mark that means drafting room.

The object of having the rough stores clerk and finished stores clerk use a stamp for their marks is to identify their O. K.'s from the routing clerk's mark, should any dispute come up later because a certain piece failed to materialize as checked.

By a glance at the bill of material the routing clerk can tell the condition of all the parts. His drafting room check means that a drawing is wanted. A blank space opposite a name means that the piece is not in existence, either in the rough or finished state, and must be ordered. A rough stores clerk check means that the piece is in the rough and must be machined. A finished stores check opposite a piece means it is all complete ready for the erector.

### The Casting Order

The casting order is a printed blank along the lines indicated in Fig. 4. The routing clerk completely fills in

Machine to be used on

Size ..... Style .....

Shop No. ..... Comb. No. .....

Make ..... castings Material .....

It is shown on drawing No. .....

Card No. ....., and is called the .....

.....

.....

Pat. No..... Wt. .....

Fig. 4—Casting Order Blank

all spaces except the pattern number and weight, getting all information from the bill of material. The pattern number is put on by the pattern storage man, and the weight by the rough stores man, when he weighs the casting.

The casting order takes a circular course. First, it is sent to the pattern storage man, who gets out the pattern, chalks the number of castings wanted on the pattern, and enters the pattern number on the casting order. The pattern is sent to the foundry, and the casting order goes to the rough stores clerk. This notifies the rough stores clerk to be on the lookout for these castings. As soon as the castings are all made the rough stores clerk weighs them, enters the weight on the casting order, and sends the casting order back to the material routing clerk.

The receiving of the casting order notifies the routing clerk that the casting he needed is now in stock in the casting store room. All this has been done with a minimum of clerical work on the part of the routing clerk, and practically none on the part of the pattern storage man, and the casting storage man.

### Machine Order

The ordering of a piece to be machined is as follows:

A machine order is written out in duplicate. The order and duplicate are given a consecutive job number for cost-keeping purposes. At the same time that the order and its duplicates are written a tag is made out called the job tag, or instruction tag, which is a fac-simile of the machine order. The job number is written on this tag also. All job numbering is done with a numbering machine set to print in triplicate.

The weight of the piece in the rough is placed on the duplicate machine order. The duplicate of the machine order is sent in to the cost-keeping department. This is its notification that time will begin to come in to them on this job.

The machine order and tag are sent to the rough stores clerk. This is his notification to deliver the casting or material to the machine shop. He ties the tag on the casting and delivers it to the machines. As soon as it is delivered he hands the machine order back to the routing clerk. This is the routing clerk's notification that the casting is now in the machine department, with the tag tied on it.

When the routing clerk receives the machine order he checks the bill of material, not with a mark as before, but with the job number that the piece is to be machined under. He copies this number from the machine order upon the bill of material. After thus checking, he sends the machine order to the machine foreman. This is the latter's notification that the material has been delivered already to him, properly tagged.

The foreman knows that the tag contains all the information necessary to enable the workman to finish the piece. The size, the style and the order number of the machine of which the piece is to become a part are stated on the tag; moreover, the number of the drawing on which the piece is shown, and the job number to which the workman must charge his time, are stated on the tag.

After the casting is machined it is sent to the assembling floor with the machine order. The assembler does the necessary hand work, charging his time to the job number. When the hand work is all done, and the piece is ready for the erector, the assembling foreman returns the machine order to the routing clerk, who is thus notified that the piece is finished and on the erecting floor. The routing clerk checks off the name of this piece from the bill of material by drawing a vertical line down through the name. The idea of using the vertical line is that when all the parts for the machine are finished the vertical line will be continuous from top of sheet to the bottom. Any break in it will be noticeable and will call attention to something missing.

The machine order is stamped "finished" by the routing clerk, with the date, and is sent to the cost department. This is its notification that no more time will come in on this piece, and that the cost of the piece can now be computed.

The ordering of the rough storage man to deliver the rough piece to the machines; the notifying of the routing clerk that it has been delivered; the ordering of the machine shop to machine the piece; the giving the workman all necessary information about machining the piece, and also the job number under which he is to work; the notifying the cost department to expect time on the piece; the notifying the assembling department that the piece has arrived there to be assembled; the notifying the routing clerk that the piece is all finished; the checking of the bill of material, and the notifying the cost department that piece is finished, is all done with a minimum amount of clerical work on the part of the routing clerk, and none at all on the part of the rough storage man, the machine foreman, or assembling department foreman.

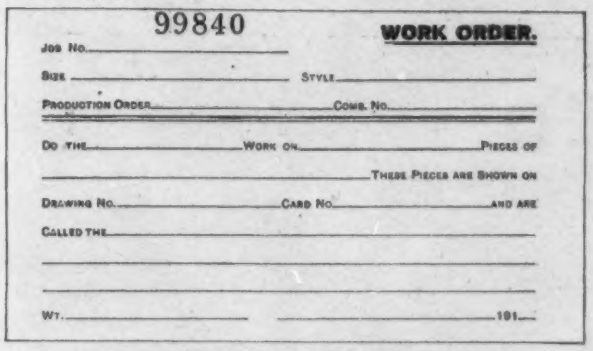
As soon as the bill of material shows that the principal parts are machined and on the erecting floor, and that all

the other parts are in a sufficiently advanced state to avoid a possibility of holding the work back, an erecting order is written, which is given a job number and is handled by the cost department in the same manner as if it were a single piece. This erecting job number is written on the bill of material and also on the erector's large descriptive tag that was received from the office at the time the order came in. The erecting order and tag are sent to the erecting foreman. This is his notification to erect the machine, all parts being either finished or nearly finished.

The workmen send their time for erecting to the cost department under the job number on the erecting tag. This tag is tied to the machine at the commencement of the erection and remains until the machine is shipped, and gives complete information to all concerned, even to the testers and shippers.

The testing department makes out a detail test sheet for each machine, which is pasted upon the bill of material by the shop routing clerk. The list of fittings to be shipped with the machine is also pasted on the bill of material.

The bill of material, stamped with the date of shipment, is finally sent to the cost department, and after the cost of the machine, as a whole, is figured, it is filed away to be the complete record of the machine.


99840

WORK ORDER.

Job No._____

Size _____ Style _____

Production Order _____ Comb. No. _____

Do the _____ Work on _____ Pieces of _____ These Pieces are Shown on

Drawing No. _____ Card No. _____ and are

Called the _____

Wt. _____ 191__

Fig. 5—Machine Order. Original, 3x5¼ In.

In the tool room is filed a master set of bills of material, which is an index to the drawing racks. One detail might be added:

Before beginning erection the erecting foreman notifies the routing clerk to deliver the parts of the machine to the erecting floor. The routing clerk then hands the bill of material to the finished stores man, who forwards the material indicated, the small parts being placed in an open box, chalk-marked with the order number of the machine.

It is a good idea for each person connected with the shop routing of parts to use a system of crude picture marks, dots, dashes and circles to represent the different items on the bill of material; a sort of shorthand that will take up small space and can be quickly written. This will be used for quick memorandum only. Using this system, a large number of notes can be put on a small sheet very rapidly.

On each casting is cast a pattern number and this number is placed on the drawing, which identifies a pattern or casting, and is useful in the pattern storage room, casting storage room, machine shop, erecting room and finished stock room.

For larger plants, the material routing system can be made more elaborate, but in doing so the principle of absolutely keeeping clerical work from the foremen must be strictly adhered to.

### Foundry System

The following is a system to take care of the work in a foundry:

The bill of material is similar to that used in the system just described, but is more complete. In addition to the number of the drawing that shows the casting, it states the pattern number and the number of core boxes for the casting.

The order for a casting is made out in triplicate. The same information is given as before, with the addition of the pattern number and the number of cores the casting requires.

The triplicate orders are sent to the pattern storage man who gets out the patterns and core boxes. They are sent to the foundry, with the triplicate casting orders.

One order goes to the core maker with the core boxes. This notifies him of the number of cores to make. The other two orders go to the foundry foreman, or his assistant. He gives one, together with the pattern, to the molder, and on the other he enters the molder's number. At the end of the day he gives the order to the rough storage or casting storage man. This is the notification to the casting storage man to watch for these castings.

If the molder fails to make the full number of castings called for on an order, or if there is a shortage on account of bad work, the casting storage man notifies the foundry foreman in writing, giving the molder's number, and the name, etc., of the casting. This is a copy of the casting order, but is on different colored paper. Constant shortage from one molder shows strongly. These slips are kept as records of the molder's bad work.

In the machine shop when work falls behind the machine order slip is called in and replaced by a similar slip of bright red. On this slip is given the date on which the piece must be finished. The same change is made with the job tag—a red one is substituted for the white. The red tag must be used sparingly, otherwise it will lose its effect.

### Taking Care of Patterns

If a plant is large and has many patterns to take care of, a good system is to number the tiers of pattern storage shelves and letter the shelves in a tier. Make out a book of pattern numbers. Enter opposite each number the shelf number and letter. The patterns are stamped with their shelf number and letters. This system makes a firm completely independent of its pattern storage man. Any one can run the pattern storage department without previous knowledge of the patterns or their location in the storage rooms.

### Short Cuts

Number the requisition orders for material that the plant buys from outside firms thus:

Start all January orders with a 1; February with a 2; March with a 3, etc. The first order in January will be 1-1; the second 1-2; the ninth will be 1-9; the tenth will be 1-10; the ninety-ninth will be 1-99; the hundredth will be 1-100. In actual practice omit the dash. The above numbers will then be: No. 11 for the first; No. 12 for the second; No. 19 for the ninth; No. 110 for the tenth; No. 199 for the ninety-ninth, and No. 1100 for the hundredth.

The advantage of this system is that the order number tells the date as well as the number.

An ingenious system of tabulating in a small space numbers that run in the thousands, such as the shop numbers of machines under construction, is to use a cross-ruled sheet, one page for each one hundred numbers. The columns across the top are headed 0, 10, 20, 30, 40, 50, 60, 70, 80 and 90. Down the left-hand edge they are numbered 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Number 22678 would be in the square where number 70 vertical column crossed number 8 horizontal column on the page of numbers running from 22600 to 22699, thus:

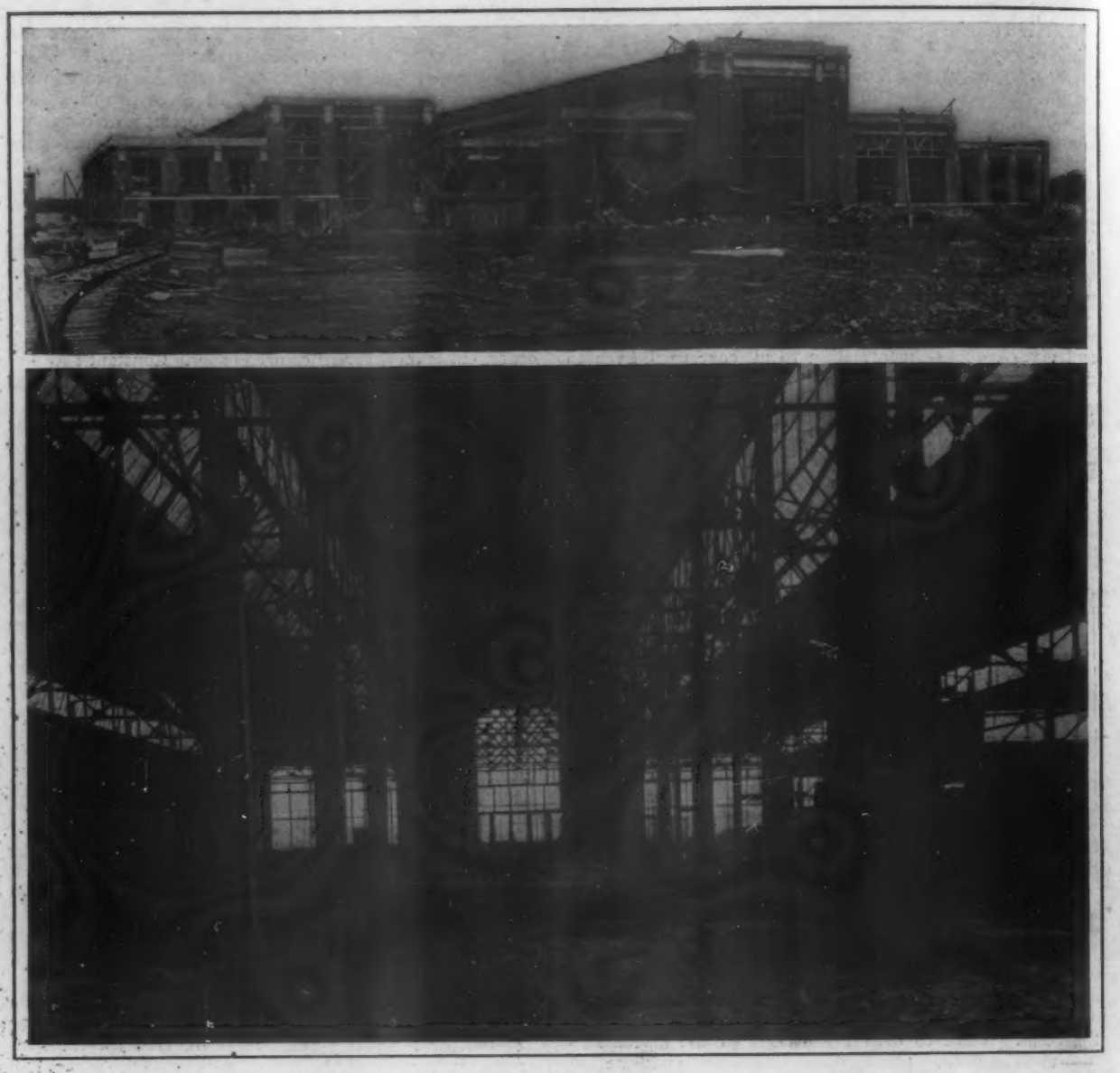
Sheet of all numbers from 22600 to 22699

| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | .. | | |
| 1 | | | | | | | | .. | | |
| 2 | | | | | | | | .. | | |
| 3 | | | | | | | | .. | | |
| 4 | | | | | | | | .. | | |
| 5 | | | | | | | | .. | | |
| 6 | | | | | | | | .. | | |
| 7 | | | | | | | | .. | | |
| 8 | ..... | | | | | | | x | | |
| 9 | | | | | | | | .. | | |

The next sheet above this would be 22700 to 22799.

To record all the numbers from 22600 to 22699 in full, in the regular way, would take over three times the space, and about five times the time, with a greater chance of error than with this system.

The making of a record running into the thousands with this system is the mere jotting down a cross, or other check mark, in the correct square. These squares can be made large so that more than one kind of a record can be made in each by using different kinds of check marks.



Exterior and Main Bay of Malleable Foundry, General Electric Company, Erie, Pa.

## The General Electric Company's Erie Foundries

An opportunity to show some general features of new foundries forming a part of the Erie Works of the General Electric Company at Erie, Pa., has resulted in the accompanying four pictures. They are reproductions of photographs which were included among lantern views exhibited at the meeting on November 20 in New York of the National Founders' Association by A. E. McClintock, commissioner of the association. The engravings on page 1434 give some idea of the malleable iron foundry, known as building No. 22, and those on page 1435 cover the gray-iron foundry, or building No. 18.

The outside view of the malleable foundry is one looking northerly and besides giving an idea of the monumental character of the architectural design, show the remarkable amount of glass surface provided and its inclined position at the junction of the walls of the main bay with the roof of the side bays, an arrangement further calculated to afford abundant daylight illumination. The interior view shows the loftiness of the foundry and its generous proportions of glazed wall surfaces.

The special attention to architectural treatment and to providing a maximum amount of glass surface is also indicated in the exterior view of the gray-iron foundry, showing the north and west elevations. The structural members of the building are massive and there is a central row of columns providing two main parallel craneways spanned by 50-ton Toledo cranes of 70-ft. span and having a 15-ton auxiliary. The cleaning room in a side bay having also a monitor roof is served by a 20-ton crane of 80 ft. span with 5-ton auxiliary. The room for large cores is also provided with a heavy crane, this of 10 tons and 45-ft. span. The room for making small cores, also a part of building No. 18, is shown in the lower of the cuts on page 1435. Large area tables are provided as indicated and to each the sand is delivered in chutes, three sections to each chute for three kinds of sand. The small core ovens are shown at the left.

---

## American Effort in South Africa

Charles E. Rogers, general manager of Fraser & Chalmers, Ltd., at Johannesburg, who is in the United States on a business trip, made some interesting statements in speaking of business conditions and certain possibilities in South Africa when seen by a representative of *The Iron Age*. Through his company he represents in South Africa, among other American interests, the New York Lubricating Company, the Robins Conveying Belt Company, New York, and the Sullivan Machinery Company, Chicago, making a specialty of heavy mining machinery. He has been in Johannesburg three years, having previously represented his company in Australia for ten years. With South Africa and its possibilities he is greatly impressed and frankly says that, much as he likes the United States, of which he is a native, he is thoroughly content to live in Johannesburg. He is a graduate of Cornell University.

Mr. Rogers says that there is at present no great demand for general machinery in South Africa because there is little manufacturing in that part of the world. Special lines, forming notable exceptions to the general absence

Exterior and Small Core Room of Gray Iron Foundry, General Electric Company, Erie, Pa.

of machinery demand, and wherein Americans excel, are agricultural machinery manufactured by the International Harvester Company, and pneumatic mining appliances introduced by the Ingersoll-Rand Company and the Sullivan Machinery Company, these two companies supplying by far the largest percentage of such equipment used in the mines of South Africa. The most extensive use of machine tools is in the shops which do repair work in the gold fields. American rubber manufactures, the crude material for which comes largely from Africa, are a large item in South African imports. Practically all of the illuminating and lubricating oils are of American production; a good many American locomotives and much American tramway apparatus are in use, while American automobiles of the less expensive types, particularly Buick and Ford models, are extensively sold. The General Electric Company has sent a good deal of electrical apparatus to South Africa, but the Germans have a strong hold on this field and have made many installations. Mr. Rogers remarks that all the recent projects in mining and other large work in South Africa are thoroughly up-to-date electrically. Without having anything in the nature of a boom, the country is undergoing a steady development and the railroads which are profitably operated by the government are being extended and harbors are being improved. The extensions to railroads must ultimately create a wider market for tools and equipment.

While South Africa is without iron ores so far as is known, copper is found in considerable quantities, and the deposits are being worked at three places. Among the companies Mr. Rogers mentions are the Cape Copper Company on the south coast, which has a large output, and the Messina Copper Company on the Transvaal, both of which are backed by British capital. The latter company is comparatively new and has been without railroad facilities, but will be reached by rail by the end of this year. Copper also is found in Belgian territory in what is known as the Katanga Concession in the Congo, and the deposits there are believed to be enormous, but production is hampered by the fact that the mineral is found in the form of carbonate and fluxes are not easily obtainable. Consequently only a small plant is in operation. Zinc properties are now being developed at Zeerust, the Transvaal, and Mr. Rogers says the outlook for the production of this metal is promising. Some tin is also found in the Transvaal and prospectors are continually seeking more.

There is a good sized American colony in South Africa, many of whose members are engaged in some branch of engineering and who make Johannesburg their headquarters. Mr. Rogers will return to Africa early in January.

---

The Associated Foundry Foremen of Philadelphia met on the evening of December 11. W. W. Parry, Baldwin Locomotive Works, Philadelphia, was elected to membership. A. G. Warren, chief engineer of the J. W. Paxson Company, Philadelphia, delivered an address on "The Sand Blast," describing and illustrating by lantern slides many types and installations of sand blast machinery for foundry and other classes of work. Considerable discussion ensued. Some 50 lantern slides of views of operations on the Panama Canal were then shown by H. A. Warren, of Frank Samuel, Philadelphia, who had spent some time on the Isthmus.

# Progress in Steel Making in Alabama

## Features of the Duplex Method as Followed at the Ensley Works—Problems of Steel Manufacture in the South

BY FRANK H. CROCKARD

[The Geological Survey of Alabama, Eugene A. Smith, State geologist, has just issued the third edition of "Iron Making in Alabama," by Dr. William B. Phillips. An added chapter on "Steel Making in Alabama," prepared by Frank H. Crockard, vice-president and general manager, Tennessee Coal, Iron & Railroad Company, is reproduced below. While it covers some ground which is familiar to readers of *The Iron Age*, the identification of Mr. Crockard with the recent developments in the duplex process at Ensley makes his treatment of that subject of particular interest.—EDITOR THE IRON AGE.]

### Early Steel Making at Birmingham

The first steel made in Alabama was poured March 8, 1888, at the plant of the Henderson Steel Mfg. Company, North Birmingham. The original furnace was of 13 tons capacity and made 200 heats before it was closed down, during which time about 1600 tons of steel were made. The pig iron used was mottled and white of local production.

The Henderson company was succeeded by the Jefferson Steel Company which operated the North Birmingham furnace in 1892 and 1893, making perhaps 1600 tons of steel. The operations were suspended in the summer of 1893, all practical development ceasing until July, 1897.

The total tonnage of basic open hearth steel made at North Birmingham from native local pig iron up to July, 1897, did not exceed 3500 tons, if indeed it reached 3000 tons. At this period the Birmingham Rolling Mill Company started its first open hearth furnace July 22, 1897, followed by the second on October 25, both designed and built by S. R. Smythe & Co. of Pittsburgh. These furnaces were of 35 tons capacity each and used basic iron made at the Alice furnace within 200 yards of the mill.*

The quality of the steel produced at this plant was excellent. The last heat was poured November 12, 1907. The plant at this period was operated by the Tennessee Coal, Iron & Railroad Company, under lease arrangement with the Republic Iron & Steel Company. The ingots were shipped to the blooming mill at Ensley and there rolled into rails or billets, which latter were used at the Bessemer rolling mill. On account of commercial considerations the plant was abandoned upon the completion of the second steel plant at Ensley.

Encouraged by the success of the Birmingham Rolling Mill Company's furnaces, and desirous of securing a more profitable outlet for pig iron, which had gone as low as $6 per ton, the Tennessee Coal, Iron & Railroad Company started work July 14, 1898, on a ten-furnace plant, designed by Wellman, Seaver & Co., of Cleveland. This plant was completed and cast its first heat on Thanksgiving day, November 30, 1899. These furnaces were of 50 tons capacity and produced about 22,000 tons monthly, when operated in conjunction with a Bessemer converter. This plant was abandoned in 1908, and replaced by four 100-ton furnaces. Since that time two additional furnaces were completed in 1908, and two more in 1910, making a total of eight furnaces which when operating to full capacity should produce from 70,000 to 75,000 tons per month.

During a period of approximately one and one-half years prior to June, 1904, five open hearth furnaces were built by the Alabama Steel & Wire Company at Gadsden, Ala. This plant was taken over by the Southern Steel Company in December, 1905, and subsequently, in July, 1909, by the Southern Iron & Steel Company. The Southern Iron & Steel Company started rebuilding the five old open hearth furnaces in September, 1909, and at the same time commenced the erection of an additional 50-ton furnace, which was completed in April, 1910.

### Alabama's Iron and Steel Production

The iron and steel production in Alabama since 1897 is shown in the following table. The column showing the percentage of iron used in the manufacture of steel is of interest as showing the use of a constantly increasing tonnage of Alabama iron within the State. This figure is obtained by assuming a yield of 90 per cent. in the open hearth furnaces, and the use of 20 per cent. scrap in all charges. No allowance has been made for the scale or ore additions:

*Production of Pig Iron and Steel in Alabama—Gross Tons*

| Year | Pig iron produced | Steel produced | Pig iron used in steel making in Alabama | |
|---|---|---|---|---|
| | | | Tons | Per cent |
| 1897 | 947,831 | 2,819 | 2,506 | .026 |
| 1898 | 1,033,676 | 9,692 | 8,615 | .026 |
| 1899 | 1,083,905 | 8,543 | 7,594 | .070 |
| 1900 | 1,184,337 | 66,076 | 58,734 | 4.9 |
| 1901 | 1,225,212 | 113,524 | 100,910 | 8.2 |
| 1902 | 1,472,211 | 176,252 | 156,659 | 10.6 |
| 1903 | 1,561,398 | 152,958 | 135,993 | 8.7 |
| 1904 | 1,453,513 | 196,623 | 174,776 | 12.0 |
| 1905 | 1,604,062 | 305,117 | 271,213 | 16.9 |
| 1906 | 1,674,848 | 320,327 | 284,785 | 17.0 |
| 1907 | 1,686,674 | 319,620 | 284,107 | 16.8 |
| 1908 | 1,397,014 | 341,336 | 303,410 | 21.7 |
| 1909 | 1,736,617 | 349,462 | 310,633 | 17.6 |
| 1910 | 1,939,147 | 529,684 | 470,830 | 24.3 |
| 1911 | 1,712,211 | 456,576 | 405,845 | 23.7 |

Neglecting special methods, the following processes are used in producing the steel of the world: Acid Bessemer, basic Bessemer, acid open hearth, and basic open hearth. The crucible process invented in 1740, by Huntsman of Sheffield, England, is not here considered, as the tonnage made by this method is small and the product used for the higher grade lines of manufacture, such as cutlery, special tool steel, etc.

### Acid Bessemer Process

The acid Bessemer was invented independently by Sir Henry Bessemer of England and William Kelly of America. Bessemer's patent was dated November, 1856,* while Kelly's was issued in January, 1857. The product was generally known as Bessemer steel, and gradually displaced wrought iron for most industrial uses, a partial list of which embraces plate, rails, structural shapes, bars, pipe, tubes and wire.

In the manufacture of Bessemer steel it is necessary to have an iron low in phosphorus, since this element is not eliminated during conversion. This requirement imposed the use of raw materials (coke, stone and ore) low in phosphorus, as Bessemer pig iron is ordinarily assumed to contain 0.10 per cent. of phosphorus or less. For a number of years this requirement was easily fulfilled by the use of the high grade Lake ores from the North in the case of the United States; Great Britain obtained a supply from her Cumberland District, from Bilbao, Spain, or the very rich ores of northern Sweden.

The process is a comparatively simple one. Molten iron direct from the blast furnace or cupola is poured into a pear-shaped vessel known as a converter, which is lined with an acid lining (ganister). Blast under a pressure varying from 15 to 30 lb. is introduced through tuyeres placed in the bottom of the converter.

The oxygen of the air unites with the silicon of the bath which is an exothermic or heat-producing reaction. Later when the temperature becomes sufficiently elevated the manganese and carbon are oxidized, upon the completion of which the bath is poured into a ladle where an

*The above data obtained from "Iron Making in Alabama," second edition.

*Bessemer's first patent was issued in January, 1855, and during the next two years he secured fourteen patents. The claims of William Kelly, Kellyville, Ky., to priority of discovery were allowed, however, and he was paid $50,000 and an annuity of $12,500 by those who took over the Bessemer patents in the United States. The first Bessemer steel rails in the United States were rolled at the North Chicago Rolling Mill, May 24, 1865, the blooms coming from the Wyandotte Steel Works, built in 1864.

addition of ferro-manganese is made, in the case of soft steel, or spiegeleisen in the case of rail steel. The metal is then poured into ingot molds from which it is rolled into the finished shape desired.

As the ores of the Birmingham district produce an iron carrying about eight times more than the Bessemer phosphorus limit, it is manifestly impossible to use the Bessemer process with Alabama irons.

### Basic Bessemer Process

The basic Bessemer process was developed by three Englishmen—Snelus, Gilchrist and Thomas. In this method it is necessary to have a high phosphorus content in contradistinction to the low phosphorus of the Bessemer. This element may be present in quantities varying from, say, 2 per cent. to 3 per cent. The presence of 1.25 per cent. to 2.00 per cent. of manganese is also desirable. The basic Bessemer iron is introduced as before into the converter, the lining of which is basic instead of acid, and is usually made of calcined dolomite. As the action of silica on such a lining is very severe, it is necessary to maintain a low silicon content in the irons, as much below 1 per cent. as possible. Heat for the reaction is developed by the oxidation of the manganese and phosphorus. The carbon, manganese and silicon are eliminated, as in the case of the acid Bessemer. Upon the elimination of these elements the "after blow" follows; calcined lime having been previously added exists as a slag at this period, affording an opportunity for the phosphorus to combine with the lime as phosphate of lime. This slag, frequently designated as "Thomas slag," has an important value on account of the high phosphorus content, which may range from 16 per cent. to 20 per cent. of phosphoric acid. This slag is ground to about a 200 mesh fineness and finds a ready sale throughout Europe.* This method has been largely used in the treatment of the irons produced from the extensive ore deposits of Alsace and Lorraine. It has not found application in Alabama for several reasons:

1. The Red Mountain ores do not carry sufficient manganese to produce the manganese content required in the iron.†

2. The metallurgical losses are higher than those of other methods.

3. The irregular quality of the resulting steel.

While local ores would not produce a pig iron high enough in phosphorus, this could be readily accomplished by returning a portion of the highly phosphoric converter slag to the blast furnace.

### Acid Open Hearth Process

The acid open hearth process is conducted in an acid (siliceous) lined, regenerative gas fired furnace. In this process the carbon, silicon and manganese are eliminated or reduced within specified limits. Sulphur and phosphorus cannot be removed by this process, the material charged consisting of pig iron and scrap must contain a lower average percentage of these objectionable metalloids than that desired in the finished product, due to the elimination or reduction of the carbon, silicon and manganese, and also on account of a slight absorption of sulphur from the producer gas.

The percentage of scrap charged may vary from 25 per cent. to 75 per cent., depending upon the supply, price and character of the material.

The process is one of oxidization. Under normal American conditions the manganese and silicon are oxidized during melting, leaving principally the carbon for oxidization after the charge has been melted. This is accomplished by maintaining the bath at a proper temperature and the addition of oxides in the shape of iron ores. When the oxidization has proceeded far enough the bath is tapped and a recarburizer added, along with the necessary quantity of ferro-manganese. While the yield is high and the quality of the product is first-class, this method is not available for large operations in Alabama, on account of the character of the pig iron.

### Basic Open Hearth Process

The basic open hearth process has a much wider application than the acid method, due to the fact that phosphorus and sulphur may be reduced or eliminated by this process. This is effected in a furnace resembling that used in the acid process, save the lining, which is made of basic material. Magnesite either in the shape of bricks or calcined lumps is the best commercial material yet discovered for this purpose. Bottom patching is made with either calcined magnesite or calcined dolomite or both. Practically all of the magnesite used in this country for open hearth work is imported from Austria.

Pig irons containing much higher proportions of phosphorus are available for basic open hearth steel than can be used with the acid method. For example, the irons made from Alabama ores will ordinarily range from 0.75 per cent. to 1 per cent. in phosphorus, or approximately 10 times more than that contained in iron used in the acid open hearth. The remarks regarding the scrap additions in the acid process are also applicable here.

Aside from the character of the lining, the important point of difference between the acid and basic open hearth process is the addition of lime, either in the raw or calcined state, forming a strongly basic slag, which under the oxidizing effects of the flame and ore causes the phosphorus to combine with oxygen as phosphoric acid ($P_2O_5$). In the presence of lime and other favorable conditions this acid unites with lime, forming calcium phosphate. The sulphur is partly eliminated by volatilization, by liquation of sulphide of manganese and by combination with the lime of the slag.

Upon tapping the bath into the casting ladle recarburization is effected by the addition of coke or anthracite coal, which is added in paper bags previously charged with a known weight of coal or coke.

In Northern practice the recarburizer is not infrequently an additional charge of molten iron. This requires an iron low in phosphorus, which is not available in Southern practice. Manganese is added in the usual manner, that is as ferro-manganese. Manifestly this process, or some of the modifications or combinations of which it is susceptible, is best adapted for the successful treatment of Alabama irons.

### Duplex Process

In the duplex process the Bessemer converter is used as an auxiliary in connection with the basic open hearth furnace, the converter performing the usual function of eliminating, partly or completely, the silicon, manganese and carbon, the phosphorus and sulphur being later removed in the open hearth.

This general scheme was the subject of Ossan's German patent, which for many years had a technical interest only. Steel was produced by this method at Witkowitz, Austria-Hungary. The first attempt in America was that of the Tennessee Coal, Iron & Railroad Company at its Ensley, Ala., plant, in Novemer, 1899. The method followed at Ensley is briefly as follows:

Pig iron from a group of six modern blast furnaces is conveyed in 25-ton ladles to a 600-ton metal mixer, a smaller mixer of 250 tons capacity acting as a spare, or serving for Sunday metal only. Accurately weighed charges of pig iron are poured from the mixer into a ladle which runs on an elevated track and from which the charge is poured in either of two 25-ton converters, the the largest in America.

The converter is then turned up and blown to meet the order of the open hearth department. That is, the iron is either "full blown" in which all of the silicon, manganese and carbon are eliminated, or "high blown" in which the silicon and manganese have been eliminated but a portion of the carbon remains. The total carbon carried in the iron is about 3.8 per cent. It is practicable to get within 0.25 per cent. of the carbon specified. The following tabulation of analyses of mixer metal and converter metal is illustrative of the Bessemer practice:

*Mixer Metal, Per Cent.*

C. 3.08, Si. 0.91, S. 0.041, P. 0.81, Mn. 0.40

*Converter Metal, Per Cent.*

| Ladle | Si. | C. | Mn. |
|---|---|---|---|
| 1 | 0.01 | 0.07 | 0.01 |
| 2 | 0.02 | 0.06 | 0.02 |
| 3 | 0.02 | 0.06 | 0.02 |
| 4 | 0.03 | 2.76 | 0.05 |
| 5 | 0.03 | 3.10 | 0.05 |

The blown metal is transferred to the open-hearth furnaces in an acid lined ladle mounted on a truck, from which it is poured by means of an overhead electric crane.

*The price of phosphate slag, with 42 per cent of total phosphates, is quoted at $11.28 to $11.52 per ton.

†There are red hematite ores in the Birmingham district that carry from 2.50 to 5 per cent of phosphorus, but they have not been utilized for making high phosphorus pig iron.

These furnaces have a capacity of 100 tons each. They are 45 ft. long from port to port, and measure 16 ft. in width, and are know as the modified Campbell Tilting type.

Before the introduction of the blown metal, they are charged with cold stock, consisting of calcined lime, ore, scale and scrap, in the order named.

When producing rail steel it is the practice to charge three soft or "full blown" converter heats and two "high blown" heats, the latter containing about 3 per cent. carbon. During the charging of the "full blown" heats the open-hearth bath remains quiescent. A rather violent reaction or "kick," as it is termed by the furnacemen, characterizes the addition of the first high carbon heat. The evolution of gases is so rapid that it blows out around the doors and ports. The frothing of the slag and metal is sometimes so active as to cause a temporary suspension of pouring the charge. The addition of the second high carbon ladle is marked by a milder reaction.

After the bath has again become normal, tests are taken for carbon and phosphorus, and if satisfactory the contents of the furnace are quickly poured into a 100-ton ladle, the slag accompanying the bath and overflowing the ladle through a special spout which diverts the slag into special slag cars, thus avoiding the usual mess of slag on the casting side of the furnace. The ladle is then carried to the pouring platform by an electric crane of 150 tons capacity, at which point the metal is poured into ingot molds in the usual manner. Recarburizing is effected by ladle additions of ferromanganese and coke. Usually the heats are ready for pouring within an hour after the blown metal additions.

If there was any doubt during the early development of the Alabama steel industry as to the practicability of producing a satisfactory grade of open-hearth steel from Alabama iron, that doubt no longer exists. It has been commercially produced to meet the most rigid specifications, and has not only successfully competetd with the products of Northern plants, but also with those of England and Continental Europe.

### Problems of Steel Making in the South

The pressing problems of to-day are not those relating especially to plant design or metallurgical methods, but rather to ways and means of diversifying the finished product, with a view of developing better and broader markets for steel products, conformable with the bountiful raw material supplies of the State, and particularly those of the Birmingham district.

That the Alabama steel industry, with its allied pig iron industry, is of vital economic interest is perhaps more fully appreciated when one realizes that the combined market value of the pig iron and steel products of Alabama, the greater part of which is produced in Jefferson County, was for the year 1910 equal to the market value of one-half of the entire cotton crop of the State. The factors constituting the fundamental elements of a successful development of the industry may be enumerated as follows:

1. Satisfactory railroad service, under which is included reasonable freight rates, sufficient equipment of proper type, and expeditious handling of traffic.

2. Establishment and development of steamship lines, permitting the cheap delivery of steel products along the Mexican Gulf and Atlantic ports, in order to meet the steadily growing competition of eastern mills. The ever increasing demands of South America are almost entirely neglected under existing facilities, or rather lack of facilities. These markets are now largely supplied by English, German and Belgian mills. For the same reason, we cannot hope to reap any advantages from a finished Panama Canal until the important factor of steamship transportation has been provided.

3. A sufficient labor supply for mines and mills. A kind Providence has so generously endowed the State with a supply of raw material, and in such juxtaposition as to warrant its classification as unique. It is worse than useless for mere man to boast of these extensive deposits if, after providing sufficient capital, his work vaingloriously ends. It requires the trained direction of the engineer and the muscle of the intelligent workman to extract treasure from the chest of Mother Earth, a finer discernment on the part of the factory technologist, and a greater skill on the part of the mechanic to produce the comparatively refined products of their work.

Why not, then, give proper attention to a labor supply sufficient in number and in qualifications to permit the industry to develop rapidly and without imposing the burdens wrought by an insufficient and inefficient labor supply? In this the manufacturer can assist by offering fair wages, by maintaining his plants in first-class sanitary condition, with reference to heating, lighting, ventilation, etc.

In ths connection a noticeable advance has been made by some of the larger corporations during recent years in all those matters relating to plant conditions which endanger life or limb. Large sums have been expended for safety appliances, covering all branches of the service. It is also, in many cases, within the power of the manufacturer to provide, directly or indirectly, more attractive houses and yards for the employees.

Since the home is the keystone of the arch of civilization and the unit composing the town or city, it seems idle to state that the subject is one which should invite the attention of the truly progressive corporation, especially in those instances in which the plant is not located within the confines of a city. The town of Corey furnishes a striking example of the substantial progress made in recent years along the lines of providing attractive surroundings, well built homes and first-class sanitary features. This city was projected and built for the special purpose of providing an industrial army with the conveniences dictated by the requirements of the modern high-class town planning.

## Manufactures in Our Foreign Commerce

More than one-half of the foreign trade of this greatest year of American commerce is conducted by or on behalf of our manufacturers. Over 50 per cent. of the exports in the 10 months ended with October were products of the factories of the United States and 52 per cent. of the merchandise imported was for use in the factories.

The value of factory products exported in the 10 months ended with October was 607 million dollars' worth of manufactures ready for consumption and 321 million dollars' worth of manufactures for further use in manufacturing, their total forming 50.3 per cent. of the entire exportation of domestic products, this being the first time in which manufactures formed as much as 50 per cent. of the exports of the period in question. The value of crude materials imported for use in manufacturing was 524 million dollars and of manufactures for further use in manufacturing 263 million dollars, the combination of the two classes of materials for use in the factories forming 52 per cent. of the total imports of the period under review and justifying the statement that over one-half of the commerce of the year has been by or on behalf of the manufacturers of the country.

These figures also seem to fully justify the prediction of the Statistical Division of the Bureau of Foreign and Domestic Commerce that the exports of manufactures in the year ending with this month will exceed 1100 million dollars, since a continuation during November and December of the monthly average attained in the 10 months would bring the total above that sum. The value of manufacturers' materials imported during the year will apparently exceed 900 million dollars, making the aggregate value of merchandise imported and exported by or on behalf of our manufacturers over 2 billion dollars, against less than 1 billion dollars a decade ago.

The 12 principal articles on the export side, products of the factories of the country, are manufactures of iron and steel, manufactures of leather, manufactures of copper, manufactures of wood, manufactures of cotton, refined mineral oils, naval stores, manufactures of paper, agricultural implements, cars and carriages, electrical instruments and appliances, and automobiles.

---

The receipt is acknowledged of the annual report of the Isthmian Canal Commission covering the fiscal year ended June 30, 1912. This is a document of 619 pages of text, with which is a portfolio containing maps and diagrams comprising plates Nos. 69 to 126. A copy has also been received of the census of the Canal Zone as of February 1, 1912.

## Savings by Oxy-Acetylene Welding

The Oxweld Acetylene Company, People's Gas Building, Chicago, has received a most interesting statement regarding the savings effected by the use of its welding apparatus in the shops of the Indianapolis Traction & Terminal Company, Indianapolis, Ind. The statement, which is made by L. M. Clark, master mechanic of the traction company, is as follows:

"The question of the welding and cutting of metals by the Oxweld process has been a most interesting one to us from the time about two years ago when we made a preliminary investigation of the process with a view to its adaptability to the requirements encountered in electric railroad shop practice. Considerable thought was expended in this direction, taking into consideration the various classes of work which could be successfully performed by this process, but as we did not take into consideration the convenience of being able to effect a saving in time as compared with the delays which frequently arise in the replacement of parts, it was with some hesitancy that the initial installation of the welding apparatus was made.

"The original installation of the welding and cutting equipment—comprising an Oxweld 100-lb. duplex acetylene generator, a number of oxygen and acetylene cylinders (the latter for portable work), the necessary regulators, blow-pipes, welding heads and welding material—was placed in service in the middle part of 1911. After about a week or ten days' instructions by one of the company's experts it was found that we were able to go ahead on our own responsibility.

"During the first few months our attention was directed to the reclaiming of such pieces of apparatus as would be the means of effecting the greatest saving directly as compared with the cost of new duplicate parts, but it was soon ascertained that not only the field but the opportunities for this process were practically unlimited, and the convenience of being able to repair a piece of apparatus quickly and return the equipment to service in less time than would be required to await the delivery of replace parts, as is often the case, became very apparent.

"About the first of the current year we prepared a form of a report from which we could determine accurately the saving which was being effected by the use of this process, and a few copies of our reports, attached, will largely speak for themselves. Taking, for instance, our reports for April to October, 1912, inclusive, a net saving of over $3,200 is shown, this amount representing the difference between the actual cost of welding—including gases, filling material and labor—and the cost of new duplicate parts. In making up these reports we have not attempted to figure an estimate to cover the saving which would otherwise be represented by the length of time during which rolling stock and machinery would have stood idle had the process not been available, as such values would necessarily have to be approximated, and we have consequently omitted it from the reports.

"The net savings per month have been variable quantities, due on one hand to the character of the parts repaired and furthermore to a shortage of oxygen brought about by the failure of the transportation companies to effect prompt deliveries of our charged and empty cylinders. For instance, in September our report shows a saving of $229.48, while for June this was $857.39, the average monthly saving from April to October inclusive being approximately $446.

"The largest single saving, as it may be termed, has been incurred in the reclaiming of railroad motor frames, 18 of which were welded in the period above referred to, resulting in a net saying of $1,420.77, or an average of approximately $78 each. Among the parts which we have welded and repaired successfully are railroad motor frames and axle caps, truck frames, transoms and bolsters, journal boxes, brake hanger brackets, motor-driven compressor frames and cylinders, brake cylinder pressure heads and contoller magnet frames, with electric railroad equipment.

"Among other work which has been accomplished is the refilling of the tapped holes in railroad motor frames, the threads of which had become stripped, and the welding of new ends on railroad motor armature shafts which had become damaged at the taper pinion fits and which would have otherwise required complete replacements. We have also cut a great variety of steel parts by this process in a fraction of the time and at a lower cost than we could have done with any other method, although we have not attempted to show the saving in our reports.

"At the present time we consider the process not only indispensable, but our records show a saving that many times offsets the cost of the welding equipment. The major portion of our work has been confined to the repairing and reclaiming of broken and defective parts that are used in our line of business, but we believe that equally good results with proportionate savings can be obtained through the services of competent workmen with this process in any shop or foundry."

One of the monthly reports to which Mr. Clark refers, and which in this instance covers the month of June, 1912, is as follows:

| Date | Name of part | Amount of material, oxy. | Amount of material, acet. | Amount of material, filler. | Time, hours | Cost of welding | Cost of duplicate new part | Net saving |
|---|---|---|---|---|---|---|---|---|
| 1 | Motor frame top | 150 | 90 | 3 | 12 | $7.85 | $105.17 | $97.32 |
| 3 | Motor frame top | 150 | 90 | 3¾ | 8 | 6.90 | 105.17 | 98.27 |
| 4 | Axle cap | 75 | 45 | 3 | 7 | 4.57 | 6.24 | 1.67 |
| 4 | Armature br'g. hous'g. | 25 | 15 | 1 | 2 | 1.86 | 7.94 | 6.08 |
| 6 | Cyld. and crank cs. | 200 | 120 | 4 | 9 | 9.27 | 13.12 | 3.85 |
| 6 | Pulley for carp. shp. | 20 | 12 | 1 | 1 | 1.14 | ..... | ..... |
| 8 | Motor frame top | 250 | 150 | 3 | 15 | 11.70 | 77.76 | 66.06 |
| 8 | Cutting anti-clim'r | 50 | 30 | ... | 2 | 2.05 | ..... | ..... |
| 10 | Cutting anti-clim'r | 50 | 30 | ... | 2 | 2.05 | ..... | ..... |
| 10 | Peckham truck fr. | 250 | 150 | 4 | 12 | 11.01 | 47.25 | 36.24 |
| 11 | Side bearing for car. | 80 | 58 | 3 | 4 | 4.01 | ..... | ..... |
| 12 | Lorain motor frame. | 30 | 18 | 1 | 1 | 1.26 | 61.56 | 60.30 |
| 13 | Peckham truck fr. | 220 | 135 | 3 | 12 | 10.09 | 44.25 | 34.16 |
| 14 | Lorain motor fr. | 30 | 18 | 1 | 1 | 1.26 | 61.56 | 60.30 |
| 14 | Peckham truck fr. | 220 | 135 | 4 | 13 | 10.42 | 44.25 | 33.83 |
| 17 | Peckham truck fr. | 150 | 90 | 2½ | 10 | 7.32 | 44.25 | 36.93 |
| 18 | Peckham truck fr. | 120 | 72 | 2¼ | 10 | 6.46 | 47.25 | 40.79 |
| 22 | Motor frame top | 160 | 98 | 2½ | 10 | 7.60 | 105.17 | 97.57 |
| 24 | 8 motor axle caps | 40 | 24 | 1½ | 3 | 1.84 | 44.72 | 42.88 |
| 27 | Motor frame top | 300 | 180 | 4¼ | 20 | 14.58 | 77.76 | 63.18 |
| 30 | Motor frame bot. | 400 | 240 | 9 | 25 | 19.24 | 97.20 | 77.96 |
| | Total net saving | | | | | | | $857.39 |

## International Steam Pump Company's Year

The International Steam Pump Company has made public the result of its operations for the year ended September 30, 1912. The previous report of the company was for the 18 months ended September 30, 1911, the company having changed the fiscal year from March 31 to September 30. It then carried to surplus $506,573 and the total surplus was $5,193,570. The income account for the year ended September 30, 1912, is as follows:

| | |
|---|---|
| Net profits from operations of associated companies | $1,887,849 |
| Depreciation | $595,705 |
| Interest, discount on bonds, etc. | 601,760 |
| Total deductions | $1,197,465 |
| Balance | $690,384 |
| Preferred dividends, International Steam Pump | 681,000 |
| Preferred dividend, H. B. Worthington | 140,000 |
| Preferred dividend, Blake & Knowles Works | 38,800 |
| Total dividends | $859,800 |
| Deficit for year | $169,416 |

At the annual meeting of the company the following directors retired: N. W. Jordan, Willis Farrington, and Nathan Fleischer. H. E. Tener was elected a director, leaving two vacancies.

---

The American Institute of Chemical Engineers held its fifth annual meeting in Detroit, Mich., December 4 to 7. The following officers were elected for the coming year: President, Dr. T. B. Wagner, Corn Products Refining Company, New York City; first vice-president, M. C. Whitaker, professor chemical engineer, Columbia University, New York City; second vice-president, Richard K. Meade, general manager Tidewater Portland Cement Company, Baltimore, Md.; third vice-president, G. W. Thompson, chief chemist National Lead Company, Brooklyn, N. Y.; secretary, J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y.; treasurer, F. W. Frerichs, manufacturing chemist, St. Louis, Mo.; auditor, George D. Rosengarten, vice-president Powers-Weightman-Rosengarten Company, Philadelphia, Pa.

# Gas and Oil Power Practice in Europe*

## Method of Increasing Gas Engine Capacity—Filter Bags for Cleaning Blast Furnace Gas—Gasification of Coke Breeze—Diesel Engines

BY H. J. K. FREYN†

The development of the internal combustion engine in Europe in the last year has been very marked and great strides were made, especially by the Diesel engine. The unparalleled progress of this prime mover, due primarily to the expiration of the basic Diesel patents, has created a wave of enthusiasm, the crest of which swept Europe only a short time ago. To the careful observer signs of an ebbing of this wave are apparent and more sober, more healthy views are gaining ground.

I was unable to find anywhere the 10,000 and 15,000-hp. Diesel engine ships of which I had read in the current literature and even Diesel engine enthusiasts do not believe that our modern leviathans will ever be propelled by Diesel engines. The largest single Diesel engine unit propelling any ship afloat develops not over 2000 hp., and there still remain many obstacles to be overcome before the single-acting multi-cylinder four-cycle or two-cycle Diesel engine on board ship is supplanted by the double-acting engine; vertical engines of the latter type are still in the experimental stage, and their future does not appear very promising on account of serious mechanical complication of scavenging pumps and multiplicity of scavenging valves in each cylinder head. The lack of the desired simplicity of these designs has prompted a number of inventors and manufacturers to experiment with the so-called "valveless" two-cycle type which presumably will become the large marine Diesel engine of the future. One valveless two-cycle experimental engine of 260 hp. is claimed to have showed an oil consumption of only 0.375 lb. per indicated horsepower per hour, which at a mechanical efficiency of 60 per cent. would give 0.462 lb. per brake horsepower per hour; in other words, the economy was as good as that of a regular two-cycle engine with scavenging valves. The mean effective pressure obtained reached 125 lb. per square inch, which is truly remarkable in view of the extremely simple scavenging method employed.

### The Junkers Oil Engine

Among the valveless two-cycle engines, the Junkers oil engine has attracted a great deal of attention; it differs essentially from the regular type and has reciprocal pistons and a three-throw crankshaft; the excellence of the form of combustion space is a great advantage of this engine, and gives it the distinction of being the best oil engine at least from a thermodynamic point of view. Practical experience alone will tell whether its unusual design and certain mechanical disadvantages will be offset by this advantageous feature. One of the foremost authorities in Europe very graphically characterized the Junkers engine as an oil engine built around a given perfect combustion chamber in contra-distinction to all other Diesel engines where it is attempted to provide a satisfactory combustion space in an existing engine. Only a few smaller size engines, mostly for marine propulsion and of the two or three-cylinder vertical type have been built abroad. The tandem arrangement of cylinders which results in the same number of crank efforts realized in ordinary single-cylinder double-acting two-cycle engines has so far been applied only on two 800 hp., three-cylinder vertical engines to be fitted in a vessel of one of the largest steamship companies.

### Large Diesel Engine Using Tar Oil

It is not certain that the large Diesel engine above 1000 hp. per unit will be an undisputed commercial success abroad since the price of natural fuel oils steadily increases, largely limiting such engines to the use of tar oil. The horizontal double-acting four-cycle M. A. N. Diesel engine in twin tandem arrangement of 1600-2000 bhp., which I had the privilege of examining at Halle, a. S., is a splendid piece of machinery and operates apparently very satisfactorily on tar oil with a small addition of ignition oil. Although it is claimed that such an engine can be sold in Germany for from $30 to $32.50 per horsepower against $35 per horsepower for steam plant, it should be expected that the repair and maintenance cost will be much higher than even that of our present gas engines on account of the high pressures and temperatures which are essential with the Diesel working principle and because of carbonization at partial loads which can be prevented only by scrupulous cleanliness. In countries where the price of coal is high this engine type may have some importance and a number of such engines of even larger unit capacity than the aforementioned one was sold in France and Russia, where fuel conditions are favorable for this type.

### Established Popularity of the Small Diesel Engine

The small and medium Diesel engine in sizes of 40 or 50 hp. in single-cylinder units up to about 600 hp. in four-cylinder units plays a vastly more important part abroad; it has unquestionably come to stay and has reached a high degree of perfection which places it right in line with the corresponding steam or gas engine plant as far as reliability and cost of operation are concerned, and far ahead of its competitors when considered from the standpoint of fuel economy. It is amazing to note how many manufacturers of gas and steam engines abroad have taken up the manufacture of Diesel engines, because they found that the sale of suction gas producer plants and smaller steam engines has fallen off alarmingly within the last few years.

The reason is plain: The single-acting four-cycle, single or multi-cylinder Diesel engine, but particularly the former, is comparatively simple in construction and operation. It does not require up-keep and attendance of boilers or gas producers and its cost compared with that of steam or gas plant is reasonable. It can be installed in the basements of buildings below occupied dwellings, whereas in Europe boilers are not so permitted. One of the greatest advantages, however, is the fact that the actual fuel consumption of Diesel engines taken over long periods of operation does not materially exceed the guaranteed figures, whereas in gas producer and steam plants this excess is quite considerable. In a Diesel plant the human element, the skill of the operator, must have much less influence upon the fuel economy than in a steam or producer gas plant where everything depends upon the efficiency and intelligence of fireman and producer attendant.

### The Horizontal Diesel Engine

The last two or three years have witnessed a remarkable development of the horizontal Diesel engine. Experience shows that the fuel consumption is only very little, if any higher, than that of vertical engines, but the horizontal type is decidedly preferred by the customer not only on account of its lower cost, but particularly owing to its greater simplicity and better accessibility, using all kinds of fuels and installed for various purposes, for instance, for power transmission, for operating flour mills, for lighting factories, sanitariums, office buildings, department stores and for electricity works.

If conditions in Europe are not altogether favorable for the development of the large Diesel engine, they are much less so in this country. The price of oil fuel in any locality must be considered in connection with the prevailing coal price to determine whether a Diesel engine installation is economically efficient or wasteful. Cheap oil fuel will favor the Diesel engine only where coal is very expensive, as on the Pacific Coast, whereas high oil and low coal prices will exclude it. Our fuel cost is not only lower and our labor cost much higher than in Europe, but the quality of our mechanical labor is not so excel-

*From an address made before the Gas Power Section of the American Society of Mechanical Engineers, New York, December 4, 1912.

†Consulting engineer, Allis-Chalmers Company, West Allis, Wis.

lent and thus the fuel cost plays a much less important rôle in the total cost of power than the items into which labor largely enters, whereas the lower standard of manufacture and especially of maintenance favors the use of simple, although less economical machinery. With the variety of conditions which prevail in this vast country, however, a large field of usefulness of the smaller and medium-size Diesel engine is assured.

### Tar Oil as the Engine Fuel

To what importance the use of tar oil has grown on the continent can be judged from the fact that France has to rely almost exclusively on the use of this Diesel engine fuel on account of the very high import duty on natural oils. In Germany a number of collieries have combined to form a company for the utilization of tar. This company operates a large factory at Meiderich, where, at present, over 300,000 tons of tar a year is distilled, producing over 80,000 tons of tar oil. This is contracted for in larger quantities at a price of approximately $12.50 per ton (5c. per gal.). With the tremendous increase in demand it is expected that before long this one factory alone will have a capacity of handling one million tons of tar per year, producing 300,000 tons of tar oil.

It is estimated that the total world production of coal tar oil is even now in the neighborhood of 1,000,000 tons per annum, and since the recognition that coal is too valuable a fuel to be wasted in our present day furnaces is spreading more and more, the number of by-product coke oven and by-product gas producer plants will steadily increase, especially in our country, so that the total production of tar oil is certain soon to double and treble, adding to our supply of natural liquid fuels an artificial product which will by legitimate competition prevent the price of the former from going sky high.

The heat value of tar oil is over 17,000 B.t.u. per lb. and its consumption in the Diesel engine is, therefore, not very much higher than that of natural oil, varying now from 0.49 to 0.46 lb. per b.h.p. hr., according to the size of the engine.

The operation of medium size Diesel engines on tar oil, especially of those above 50 hp. per cylinder and with open fuel injection nozzle is satisfactory. For smaller engines the addition of a so-called ignition oil is necessary, which fact somewhat complicates these engines.

### Status of the Gas Turbine

Renewed activity is noticeable abroad in the matter of designing an adequate gas turbine, and I noticed that much interest is taken in this question by the most prominent manufacturing concerns in Europe. The foremost authorities abroad are convinced that the gas turbine will soon come to stay, and, while this really is not an extraordinary prophecy in view of the universal tendency toward revolving high-speed machinery, the statement would seem warranted that whenever the time of the gas and oil turbine does come, it will nothing short of revolutionize power production in the large steel centers and wherever natural fuel oils abound in this country.

The apparently inexhaustive supply of cheap coals, lignites and peat, and especially of crude oil, together with the conditions of our labor supply, make the future of the gas turbine in the United States much more promising than in European countries. As mentioned before, we do not possess as high a class of labor as Germany, for instance, where the education of centuries has resulted in a quality of mechanical labor unsurpassed for manufacturing and taking care of thermally economical but mechanically rather complicated machinery. The tendency, so apparent in this country, to invest money with a view of immediate returns, a tendency demanding primarily cheap and reliable machinery, and concerned in a considerably less measure in the question of high fuel economy, will be favorable to the introduction of the gas turbine.

The gas turbine is destined to bridge over the chasm between the gas engine and the steam turbine, if after proper development it should eventually even just approach the economy of the gas engine, for it shares with the steam turbine the advantages of low cost, large unit capacity, reduced unit weight, small floor space, high speed and simplicity of operation and maintenance, whereas its better thermal efficiency will make it a serious competitor in plants where gas engines are now used. A large experimental gas turbine in Germany is operating splendidly, mechanically speaking, although the problem of satisfactory thermal efficiency still remains to be solved.

### Engines Using Blast Furnace and Coke Oven Gas

The use of the so-called industrial waste gases has progressed considerably. The four most prominent manufacturers in Germany alone are now building large gas engines for blast furnace and steel works at the rate of 120 per year and a number of twin tandem engines of 5000 b.h.p. operating very satisfactorily on rich coke oven gas can now be seen in German coking plants. The splendid results obtained with gas blowing engines in Germany have prevented the turbo-blower from getting a firm foothold in that country, although its use in France, England and Russia is steadily increasing. Blast furnace gas engines for blowing and electric power purposes and even for operating rolling mills, are to-day the standard equipment for old and new plants, even where the coal price is fully as low as in our Pittsburgh district.

Within the last two years the use of coke oven gas for producing electric power by gas engines has greatly increased and after overcoming the many earlier difficulties the coke-oven gas engine is to-day just as safe and reliable as the blast-furnace gas engine. These difficulties arose principally from overrating the engines, and from sulphur in the engine gas. Since the reasons for the trouble were recognized, the causes or their consequences are now avoided, so that in a number of plants sulphur of considerably over one grain per cubic foot of gas is very successfully handled in coke-oven gas engines if the proper very simple precautions are taken.

### Materials of Construction of German Gas Engines

The most prominent gas engine builders are now governing their engines on a simple combination quantity-quality regulation principle. The valve gear has been much simplified by all manufacturers, resulting not only in a reduction of the cost of manufacture, but also of operation of these engines, and gas engine prices are, generally speaking, lower than they ever were before. The gas cylinders, after a few unsatisfactory attempts to use steel castings are invariably made of cast iron and with the exception of a few types they are cast in one piece with integral water jacket. The gas cylinders are often provided with hard cast-iron liners. The cracking of gas cylinders which formerly occurred altogether too frequently after a short time of operation, is now much reduced by proper design, selected material and better pouring methods.

Experience has taught that the life of a gas cylinder can be materially increased if the water jackets are thoroughly cleaned from all scale and muddy deposit at regular intervals of 4 to 8 weeks, depending upon the character of the cooling water used. This matter is of the greatest importance and should be heeded more than it is in this country. It was found by experiment that the average temperature of the cylinder wall increases at an amazing rate with even a very thin layer of scale forming in the water jacket, and in certain plants, with hard cooling water acid and wire brushes are resorted to from time to time to take the accumulated scale from the cylinder walls. It has been found that frequent shutting down and starting of gas engines shortened the life of the cylinders materially if the engines were allowed to cool off too much during shut-downs.

The average life of a gas cylinder in the large steel plants in Germany is pretty generally reckoned to be 5 to 6 years. This is accepted as a matter of course and the expense incurred by replacement is simply distributed over this number of years in the cost figures.

### Cost of Gas Power in German Steel Plants

The cost of producing electric power in German blast furnaces and steel plants is about $2.70 per 1000 kw.-hr., comprising $1.25 in the raw blast furnace gas and including cost of gas cleaning, cost of labor, repairs and supplies of all kinds, but without interest and depreciation on the money invested. This figure applies on an annual output of about 100,000,000 kw. hr., and a use factor of approximately 60 per cent.

### Further Details of Construction

The gas pistons are generally ribless iron castings, although for large engines steel cast is used. One con-

cern has recently introduced for blast furnace gas engines one-piece solid, non-cooled forged steel pistons. The piston rods are now usually made of open-hearth steel of about 100,000 lb. tensile strength, uncambered, and their diameter is approximately 26 per cent. of the diameter of the gas cylinders. A variety of piston rod coupling designs is used, but the threaded connection enjoys the best reputation. It is noteworthy that crossheads are made of forged nickel steel.

No uniformity of design can be claimed for piston rod packings, but they invariably consist of single or double sectional cast-iron packing rings pressed against the rod by garter springs and separated by solid one-piece rings forming 12 to 14 chambers. It is universally claimed that the clearances of the ring sections must be reduced to the possible minimum.

The exhaust valves are made of forged steel or of Durana metal, and are now almost exclusively of the non-cooled mushroom type. Some builders, however, still prefer water-cooled exhaust valves for coke-oven gas engines.

### Filter Bags for Cleaning Blast Furnace Gas

The progress of the large gas engine in Europe has been accompanied by great improvements in the method of purifying blast furnace gas. One of these new methods works on the principle of filtering the gas in a perfectly dry condition, so that no water is required save that necessary to cool the engine gas to atmospheric temperature. The filtering is achieved by means of Beth filter bags, which are made of special fabric and suspended vertically in several air-tight compartments. The raw blast furnace gas coming from the furnace at high temperature is first cooled by radiation to about dew point (around 130 deg. F.) and thereupon superheated approximately 20 to 30 deg. by using any available source of heat, such as waste heat from the gas engines, exhaust steam or even the sensible heat of the raw blast furnace gas itself. By cooling the gas a large amount of moisture is removed and the scorching or burning of the filter bags prevented, whereas the subsequent superheating avoids condensation of the remaining vapor and clogging of the bags.

The raw gas under the action of a fan passes from the inside to the outside of the filter bags, depositing all impurities on the surface. The layer of dust naturally increases continually and would eventually render the bags impenetrable, were it not for an automatic mechanism which in a fashion, similar to that used in flour mills, shakes the bags at regular intervals of about 4 min. and causes the dust to drop off. Simultaneously the compartment which is to be cleaned is automatically separated from the others, and the direction of gas current reversed; the purified gas surrounding the filter bags now enters the latter, opening the pores of the filter material, which were previously closed up by the passing dirty gas current. The dust shaken off the filter bags falls into a receptacle, from which it is removed in a perfectly dry condition.

Two experimental filter plants installed at Halberger, Huette and Duedelingen, have capacities of about 10,000 and 14,000 cu. ft. of gas per minute, and clean the gas for gas engines only. It is claimed that the power consumption is 2.5 to 3 times lower than that of hydraulic fans and Theisen washers, that the water consumption is only one-fifth to one-sixth of the corresponding requirements of wet-cleaning plants, and that the dust contents in the purified gas is below 0.0004 grain per cubic foot, or 15 to 30 times lower than in the purified gas obtained with the older wet cleaning apparatus. The cost of operation is furthermore claimed to be much lower and the cost of installation only a little, if any, higher.

On the strength of the satisfactory results obtained, many blast furnace plants in the Minette district, and even in Westphalia, have decided to install gas filtering plants, varying in capacity from 17,500 to 140,000 cu. ft. of gas per minute. One manufacturing concern alone, which acquired the rights for Germany, had in the month of July orders for installations for 21 plants, with a total capacity of 825,000 cu. ft. of gas per minute and valued at $1,000,000.

### Results of Gas Purifying on Disintegrator System

The other new system of gas cleaning makes use of the "disintegrator" principle; two well-known concerns in Germany, specializing in gas washing apparatus, have developed this system on somewhat different lines, and one of them claims to have on hand orders for disintegrator gas washers capable of purifying 1,750,000 cu. ft. of gas per minute. One machine only is used for preliminary purification of boiler and stove gas from 2 to 3 grains per cubic foot to 0.088 to 0.175 grain of dust per cubic foot, with a water consumption of only 10 gal. and a power consumption not exceeding 0.072 hp. per 1000 cu. ft.; for gas engine purposes two disintegrators are placed in tandem which causes the power consumption to increase to 0.13 hp., the water consumption to 18 gal. per 1000 cu. ft., whereas the amount of dust in the gas drops to 0.0044 to 0.0088 grain per cubic foot.

### Successful Gasification of Coke Breeze

The days of the wasteful bee-hive coke oven are fortunately past, and the highly economical by-product coke oven is gradually taking its place. The manufacture of coke entails the accumulation of large quantities of coke breeze, which cannot always easily be disposed of. Successful attempts were recently made in Europe to gasify this coke dust in special gas producers. One system operates with liquid slag very much on the order of a blast furnace, whereas the other adapts a well-known European producer design to the special requirements of gasification of very fine fuels. In a number of European blast-furnace and coke-oven plants this coke breeze will be gasified in such producers, and the resulting gas of about 150 B.t.u. per cubic foot admixed to blast-furnace gas to increase its quantity and improve its quality.

Mixtures of industrial gases are used more and more for metallurgical and power purposes abroad; in one plant in England a mixture of blast-furnace and coke-oven gas is used for all heating purposes and to operate gas engines. At first glance it may seem difficult to obtain a sufficiently uniform mixture of two gases so different in specific gravity, but experience has shown that modern blast-furnace gas washers of the revolving type, such as fans, Theisen washers and disintegrators are splendidly adapted for this purpose, and that changes in the quality and heat value of the mixed gas of even considerable magnitude do not seriously affect the operation of gas engines.

### A System for Increasing Capacity of Gas Engines

Another very interesting novelty of perhaps great importance for future gas-engine application is in operation, namely, a system of overloading four-cycle gas engines 25 to 35 per cent. of their normal capacity. The method devised and patented by one of the foremost gas-engine manufacturers in Germany and which creates an almost perfect analogy with the condensing plant of steam engines consists in scavenging ordinary four-cycle gas engines and introducing the fresh mixture under a pressure somewhat higher than atmospheric. This is achieved by raising the pressure of the combustion air and gas in turbo blowers to a gauge pressure of a few inches of mercury and by scavenging the spent gases of the previous power stroke with a blast of this air, subsequently introducing gas and air under slight pressure into the combustion chamber. By utilizing the waste heat of the gas engines for raising steam in suitable waste-heat boilers and driving steam turbines direct connected to the turbo blowers, the power requirements of the auxiliaries can amply be supplied without resorting to outside sources of power, nor detracting from the increased output of the gas-engine generator.

An overload of 35 per cent. was attained without raising the initial pressure—an important point—and without appreciable increase of the heat absorbed by the cooling water; the thermal efficiency of the scavenged engine was found to be somewhat and the mechanical efficiency considerably better than that of the non-scavenged engine.

In another steel plant two tandem engines of 1360 kw. or 2000 b.hp., normal rating (at 65 lb. mean effective pressure), which were provided with generators of 1700-kw. capacity in anticipation of the overload scheme, can carry loads of 1800 to 2000 kw. Before the changes were made in April, 1912, the average kilowatt output per engine in 12 hr. as ascertained from the log book was 13,000 kwhr., but since installing the scavenging plant the average output was raised to 18,000 and 20,000 kwhr. in a 12-hr. run, corresponding to an average increase of approximately 40 per cent.

Regarding the financial aspect of the matter, it can be shown that the capacity of an existing gas-engine plant can be increased 30 per cent., provided the generators are large enough, at a considerable saving compared with the cost of providing for this increase in capacity by installing additional non-scavenged units.

### The Humphrey Pump

The technical press has been rather silent during the last year regarding the Humphrey pump, but according to reliable information this is by no means an indication that this gas pump has passed out of existence; on the contrary, one of the largest concerns in Germany is devoting much time and effort on experiments to generate electric power with such a pump at its factory, and a 40,000,000-gal. pump will be installed in England on which a coal consumption of 1 lb. per effective pump horsepower was guaranteed.

---

# Correspondence

## The Iron Ore and Pig Iron Statistics of the Geological Survey

*To the Editor:* In *The Iron Age* of November 21, 1912, page 1223, appears a criticism of the report on the production of iron ore, pig iron and steel in 1911, issued August 16, 1912, by the U. S. Geological Survey. Since the report referred to was prepared under my supervision may I be permitted to answer some of the points discussed in your columns?

Taking up the comments in the order in which they appear: You question the sources from which information was drawn in preparing this chapter, and characterize as remarkable the following statement with regard to the prospects for the iron and steel industry in 1912:

The prospects for 1912 are encouraging, but as at no time since 1907 has the excessive capacity for manufacturing iron and steel been fully utilized, nothing short of abnormal activity, which is not likely to occur in 1912, will result in employing the full capacity of the plants.

It should be explained here that the introduction to this report, with the exception of the final figures of production, was written at the beginning of 1912, so the statement with regard to the prospects for the iron and steel industry in 1912 was a prophecy, not a retrospect. The sources of information were the leading trade papers of that date. No less an authority than *The Iron Age* of January 4, 1912, makes the following statement:

The hopes of steel manufacturers are built largely on four years of starveling consumption by the railroads, the average rate in that time being less than 50 per cent. of that for 1905, 1906 and 1907. But, while they look for greater activity in 1912 than in 1911, they do not forget two things: First, that manufacturing capacity in iron and steel and in all other lines is excessive; second, that steel trade booms have always sprung from a large demand for equipment for new plants and extensions, and that there is no probability of the reappearance of such a demand in 1912.

The Industrial World of January 1, 1912, commented as follows:

It is expected 1912 will start in easy and, it is hoped, will gradually improve, although a year of political unrest, which should be taken into serious consideration.

The Engineering and Mining Journal of January 6, 1912, commented as follows:

It [production in 1911] still failed to come up to the capacity of the furnaces and mills, greatly enlarged as that was in 1907 and the two succeeding years. Averaging roughly, it may be said that the activity in finished steel, which is the final test, gradually increased from about 60 per cent. of the total productive capacity up to 75 per cent.; with the prospect that 1912 will open with nearly 85 per cent. employed.

The tone of all these prophecies would, therefore, according to the criticism, also be regarded as "remarkable."

Although the final figures of production may not be ready for the printer until several months after the beginning of the calendar year, the Survey pamphlets do not as a rule chronicle the events of the year following that for which the statistics are given, and in this case the iron ore chapter for 1911 is no exception.

#### THE CHANGE IN IRON ORE STATISTICS.

With regard to the change in the basis of iron ore statistics it should be stated that it has been decided to base the Survey figures of output on *marketed production* instead of on quantity mined, in order (1) to conform to the Survey usage in the case of coal and many other products, and (2) to make it possible to obtain more accurate statements of value from the producer. That there should be some confusion the year the change was made was inevitable, since the statistics for two successive years are given for comparison, but in the report for 1912 the detailed figures by States for the year 1910 will drop out and the tables for 1911 and 1912 will be given on a directly comparable basis. While the tables given in the 1911 pamphlet retain the heading "Production of Iron Ore," it is made plain in every case that the figures for 1911 represent marketed production. In previous years, before the present writer undertook the preparation of the statistical reports on iron ore, etc., the stocks shipped to the lower lake ports and to blast furnaces *during the year* (not the accumulations of previous years, however), were included in the ore production as distinguished from stocks remaining at the mines, and these shipments have in 1911 been included in marketed production. Thus there is no change from former Survey usage in this respect. In view of the evident interest in the actual production of iron ore, an additional table showing the quantities of ore mined annually is to be included in future reports.

#### THE ERROR IN CUBAN IRON ORE STATISTICS.

With regard to the statistics of shipments of iron ore from mines of the Spanish-American Iron Company in the Province of Oriente, Cuba: The reports received by the Survey from this company show the following quantities marketed in 1911, with no unsold stocks at mines: Daiquiri mine, 517,730 long tons; Mayari mine, 698,790 long tons, and no stocks, giving a total of 1,216,520 long tons. Although the American Iron and Steel Association may state that the Spanish-American Iron Company's shipments last year were 640,510 tons, is there not a possibility that the figures published by that organization may be incomplete in this instance? It is true that there is a discrepancy between the production of iron ore from Cuba as reported to the Survey, and the imports of iron ore from Cuba as reported to the Bureau of Statistics. The figures of imports have been verified by that Bureau. The Survey published merely the reported figures, but in view of the large differences between shipments and imports the question has been referred back to the producers.

#### PIG IRON STATISTICS

With regard to the collection of statistics of pig iron production, your article says: "* * * 23,257,288 tons. This latter may be intended as an approximation of the production of coke and anthracite pig iron, leaving out charcoal iron, but even at that, the statistics were not collected by the Geological Survey, and should be credited to the sources from which they were taken." In reply to this statement it should be emphasized that the Geological Survey most certainly did collect the statistics of total output of pig iron in 1910 and 1911, as given on page 38 of the Mineral Resources pamphlet. The above quantity represents the tonnage marketed in 1911 as reported to the Survey by the producers. The collection of output of pig iron was undertaken by the Survey in order to obtain corresponding values or selling prices *at the blast furnaces*. For several years prior to 1910 the Survey collected statistics of values only, and applied these to the quantities of pig iron as reported by the American Iron and Steel Association. This arrangement naturally resulted in confusion and inaccuracies, most of which have been eliminated by the new and simpler arrangement. The production of pig iron by grades according to the statistics of the American Iron and Steel Association was given for purposes of comparison, although the totals do not agree with the Survey totals for pig iron. The disagreement between the totals published by the two organizations is due to the fact that the American Iron and Steel Association reported production while the Survey reported the tonnage sold.

DESIGNERS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

NO SURVEY STATISTICS OF STEEL

With regard to the inclusion of the words "and steel" in the Survey's statement concerning collection of statistics of pig iron and steel, and the omission of complete credit for the steel statistics, these were wholly unintentional but regrettable errors that crept in through clipping and editing printed pages of a former report in making up material for the later pamphlet. The author of the iron ore report offered, one week before your article appeared, sincere apologies to the general manager of the American Iron and Steel Association regarding these matters as follows:

November 14, 1912.

Mr. James M. Swank,
American Iron and Steel Association,
261 S. Fourth St., Philadelphia, Pa.

Dear Sir: Your letter of November 13 is just received. I am glad you wrote me about the omission of acknowledgments of steel statistics at this time because it permits me to make partial reparation in the proof of the volume of Mineral Resources for 1911, which contains the iron and steel statistics and which of course is a much more permanent record than the advance chapters which are supplied to the trade as early as possible.

Before proceeding further please permit me to offer my humble apologies for allowing an omission of this sort to pass unnoticed. * * *

The Survey makes no attempt to collect the statistics of steel production and of course could not intentionally claim credit for such work. * * * I am now inserting in the proof of the volume for 1911 certain acknowledgments that I hope will give full credit to your statistics at every point.

I realize how you must have been annoyed in this matter and only wish you had written me sooner. Nearly every day I read in engineering and trade magazines tables of cement statistics that the Survey originally collected and published and which no organization other than the Survey is able to get, and yet for which no acknowledgment whatever is offered. I have ceased, however, to make any objections to these failures to give credit because I feel that after all the Survey is working for the public and whatever it produces is public property. With your Association it is different, and I shall at once and in the future endeavor to see that full credit is placed where it is due.

To this statement it might be added that until my attention was called to the matter, on November 13, no member of the Survey was aware of the apparent discourtesy to the American Iron and Steel Association, and it is indeed a pleasure to do whatever is possible to rectify the matter.

E. F. BURCHARD, Geologist.

Washington, D. C., December 9, 1912.

---

**Comment by "The Iron Age"**

The criticism of the Geological Survey's report on iron ore and pig iron in 1911 was made in no captious spirit. Accuracy in recording the performance of the country's greatest manufacturing industry is of the highest importance, and evidences of inaccuracy in the report in question were such as should not go unnoticed. It is to be regretted that the continuity of the statistics of iron ore production in the United States has been broken by the course taken by the Survey in reference to the returns for 1911; but we are glad to see that for 1912 and following years the amount of iron ore actually mined, which is the real measure of the performance of the iron mining industry in a given year, will be gathered as heretofore.

We shall not dwell on the discrepancy in the Survey's own figures for Cuban iron ore shipments in 1911, but only suggest that now that attention has been drawn to it, there is opportunity for correcting it in the volume of Mineral Resources for 1911. It will probably turn out that the Survey has reported the total of the wet Mayari ores as mined, and not the ore in final shape for sending to market, after treatment in the nodulizing kilns at Felton. It has also doubtless included considerable ore that remained in stock at Felton and at Daiquiri and that therefore was not "marketed production." We consider this discrepancy to be typical of the error and confusion sure to result from the attempt to make shipments or marketed production the gauge of the iron mining industry rather than ore mined, as was pointed out in our original article.

Mr. Burchard's statement concerning his collection of the pig iron statistics for 1910 and 1911 gives the reason which impelled the Survey to undertake this work, but it will scarcely satisfy the iron industry with the results of the attempt. We must take exception to his statement that the "Geological Survey most certainly did collect the statistics of total output of pig iron in 1910 and 1911." We have before us the blank which the Survey employed for that purpose. What is most striking about it is that it does not call for "production" or "output" of pig iron. What it calls on furnace companies to supply is the "quantity of blast furnace products of your own manufacture, sold or used by you during 1911, and value f.o.b. furnaces." There is also a heading for "stock on hand unsold December 31." The theory of the Survey evidently is that by knowing "stocks on hand unsold" at the beginning and end of a year, and the amount of pig iron sold or used in the year, production can be arrived at by addition and subtraction. Without going into details which would unduly lengthen this comment, and with which those are familiar who know the selling practice of pig iron producers and their method of reckoning "unsold stocks," it may be said that the items called for by the Survey in its pig iron blank will never bring it any approach to accuracy in reporting the country's pig iron "production" or "output." For 1910 it found a pig iron output of 26,674,123 gross tons, or 629,444 tons less than the actual production as shown by the authentic figures of the American Iron and Steel Association. For 1911 it found a total of 23,257,288 tons, or 392,259 tons less than the American Iron and Steel Association figures. It may well be asked why, if the Government must go into the collection of statistics of the American iron industry, which will be sent to other countries with Government sanction, it should thus understate the real performance. A matter of more than 600,000 tons in one year, and of nearly 400,000 tons in another is a grave discrepancy from either a statistical or a commercial standpoint. It is most unfortunate that after all the years in which the American Iron and Steel Association statistics have been received, and rightly, as authoritative, the Government should attempt an independent collection, with resulting confusion and error.

Concerning the prophecy for 1912, which Mr. Burchard explains by citations, about all that need be said is to question the value of attempts at prognosis in a Government report that is not published until nearly three-fourths of the period dealt with has passed into history.

---

## Cambria Steel Company's Coke Contracts

The Cambria Steel Company, Johnstown, Pa., has filed suit against the Sunshine Coal & Coke Company, Uniontown, Pa., claiming damages for $137,708.13 for alleged violation of two contracts for coke. The plaintiff company claims that it was compelled to buy coke elsewhere at a higher price, and seeks to be reimbursed for its loss.

One contract was made for the delivery of 20,000 tons a month to begin July 1, 1912, and running for two years, the price to be based on a ratio of 8 to 1 on the price of basic pig iron at Valley furnaces. The minimum price was to be $1.65 f.o.b. oven, and the maximum $1.90 until basic iron should exceed $19.75 at Valley furnaces, when the maximum price of coke should be advanced to $2. The claim is made that there was a default in August, September, October and November. The plaintiff company sets forth that it was compelled to supply the deficiency at a cost of $1.12 a ton above contract price, the loss being $79,152.41.

Another contract which was made for 10,000 tons a month for two years beginning January 1, 1911, with option for another year, providing a 90 days' notice before the expiration of the two year term, was not kept, according to the plaintiff's claim. The price on that contract was to be $1.95 a ton f.o.b. oven. There was an alleged default of 57,356 tons. The Cambria Company says it purchased coke at a loss of $1.021 a ton, or a total loss of $58,555.72.

---

The Upson Nut Company, Cleveland, Ohio, is making a number of improvements in its steel plant. A 125-ft. extension is being built to the finishing mill to provide increased storage capacity. The billet and scrap yard is being extended and new crane runways are being provided. A new 10-ton Alliance Machine Company crane will be installed to provide additional conveying service in this yard.

## Mill Scale as a Cause of Pitting

### An Investigation of the Corrosion of Steel and Iron Plates

An interesting series of tests were reported in a paper before the International Congress on Applied Chemistry, in New York, in September, by George C. and Melville C. Whipple of Hazen & Whipple, consulting engineers, New York, on the relative corrosion, and a reason therefore of iron and steel plates. An abstract of the paper follows: A few simple immersion tests were first made. Samples of the steel and iron were placed in jars of distilled water, Brooklyn tap water, salt solutions, solutions of chloride of lime, dilute acids, strong acids, etc., and observations and analyses made to determine the relative amounts of corrosion of the different samples. The immersion tests in tap water and dilute solutions progressed too slowly, while the use of strong solutions failed to reproduce in the laboratory the conditions that would be met in actual practice.

Finding that the ordinary accelerated tests using strong acids were unreliable, a test was tried in which corrosion was stimulated by a current of electricity; that is, an electrolysis test. This was not employed for the purpose of observing those phenomena of corrosion that ordinarily occur when stray currents from high voltage electric lines find their way to a pipe line or other steel structure, but it was thought that this test would show the manner of corrosion, as distinguished from the total amount of corrosion, better than the acid tests, and inasmuch as the real question at issue was one of pitting, and not one of general rusting, the electrolysis test seemed to be a more reliable one for the case at hand.

#### Conclusions Resulting from Tests

From the tests made it was concluded that the presence of small amounts of copper in steel, while they may retard corrosion by strong acids, do not serve to protect the steel against corrosion in weak acid solutions or in ordinary water. The presence of copper does not materially alter the electrical conditions of the scale, and does not, therefore, protect the metal against pitting.

Samples of American ingot-iron plates tested were found to have an index of corrosion uniformity somewhat higher than that of ordinary steel plates, with or without copper, but lower than that of wrought iron. So far as failure by pitting is to be feared, therefore, the ingot iron may be regarded as somewhat better than steel; but probably not enough better to justify any great difference in cost. Exposed to severe acid corrosion, ingot iron is probably more serviceable than steel, but under ordinary conditions of corrosion in soil or water, it has only a slight advantage over steel.

Wrought iron has a very much higher index of corrosion uniformity than steel or ingot iron and is much less likely to pit. This seems to be in accord with experience. Under conditions of severe chemical corrosion, sufficient to remove the mill scale and silicates, or under conditions of atmospheric corrosion, when the electrolytic form of corrosion does not predominate, there is probably little difference between the two metals.

#### Effect of Removing the Mill Scale

A partial removal of the mill scale, it is added, tends to increase corrosion as it gives opportunity for electrolytic action between the scale and the raw metal. Scale becomes chipped off in handling and in fabrication. The complete removal of the mill scale from steel plates of a pipe line, the paper continues, increases its index of corrosion uniformly from about 50 to nearly 100 and this reduces materially the danger of pitting. The electrolysis tests made with steel plates, from which the mill scale was removed, did not show pitting in a single instance. Scale removal appears, therefore, to be a secure method of protection against pitting. To some extent it has been practiced, the mill scale being removed by pickling in acid, by sand blasting, etc. These processes unfortunately are expensive, but may be justified under some conditions. Steel of ordinary quality with the mill scale removed will probably withstand pitting better than the more expensive ingot iron and copper steels, and just as well as wrought iron itself.

It is possible that some method may be found to modify the mill scale during manufacture so as to make it more uniform or improve its electrical condition, or make it more easily removable. It certainly seems as if the next step in advance in steel manufacture lies in securing a better control of the character of the mill scale.

## Steel Corporation Iron Ore Output

### Arrearages on the Hill Lease Almost Made up by This Year's Shipments

DULUTH, MINN., December 14, 1912.—Iron ore shipments of the year to December 1 by the Oliver Iron Mining Company (United States Steel Corporation) have been about 49.45 per cent. of the total from the Lake Superior region, and are as follows in gross tons:

| | | | |
|---|---|---|---|
| | *Menominee Range* | | |
| Aragon | 224,812 | Riverton | 175,943 |
| Chapin | 327,999 | | |
| Iron River | 17,302 | Total | 766,056 |
| | *Gogebic Range* | | |
| Atlantic | 142,186 | Plumer | 47,578 |
| Aurora-Norrie | 1,500,758 | | |
| Tilden | 158,191 | Total | 1,939,396 |
| Puritan | 90,683 | | |
| | *Marquette Range* | | |
| Lake Superior | 219,763 | Stegmiller | 50,963 |
| Queen | 351,916 | Total | 622,552 |
| | *Vermillion Range* | | |
| Pioneer | 647,336 | Zenith | 477,318 |
| Savoy | 90,587 | | |
| Sibley | 309,183 | Total | 1,613,138 |
| Soudan | 88,714 | | |
| | *Mesaba Range* | | |
| Hull-Rust | 2,232,180 | Dale | 1,104,894 |
| Winifred | 91,806 | Harold | 187,546 |
| Clark | 498,183 | Mace | 136,282 |
| Chisholm | 692,911 | Mississippi | 274,406 |
| Glen | 15,932 | North Uno | 534,815 |
| Myers | 101,558 | South Uno | 1,305,278 |
| Adams | 992,065 | Leonard | 2,194,114 |
| Spruce | 740,229 | Canisteo | 2,097,406 |
| Fayal | 458,593 | Holman | 915,969 |
| Genoa | 1,314,719 | Hill | 1,186,252 |
| Gilbert | 135,625 | Two trespasses | 528 |
| Alpena-Sauntry | 1,025,301 | | |
| Norman-Virginia | 618,565 | Total | 18,869,145 |
| Total, all ranges | | | 23,810,287 |

In addition to these amounts there was, on December 1, a little ore going forward all rail from the Lake Superior, Queen and Iron Ridge mines, so that the year's figures will exceed the above by a small amount.

Total shipments out of properties in which the Great Northern road is interested amounted to 9,939,762 tons, but in the case of some of these the Great Northern owns or controls but a half interest, so that the actual tonnage shipped in the year under the Steel Corporation's Great Northern lease was a little more than 8,000,000 tons. The stipulated minimum for the year was 4,500,000 tons, so that this vast shipment takes up some 3,500,000 tons of previously accrued and paid for minimums. As there were at the commencement of this year total unshipped minimums of 3,680,000 tons, the Steel Corporation is now nearly even on Great Northern ore, and has taken out practically all the ore on which it has paid royalties. Minimums accruing under the Great Northern lease to its conclusion amount to 11,250,000 tons, and if the Steel Corporation is able to mine as rapidly in the two years coming as it has this year, it will close the term with an excess over the minimums amounting to no less than 5,000,000 tons. Two years ago such a consummation would not have seemed possible. It is believed that the average royalty and freight paid this year under this lease has been about $1.79, which is 3c. below the standard base. As the freight rate this year is but 60c., the actual royalty paid amounts to $1.19. Under the former rate of freight to Lake Superior the royalty would have been 99c. a ton.

---

The 2500-ton American steamship L. V. Stoddard of the Boston & Virginia Transportation Company sailed December 10 from New York for Italy with a cargo of grain, being the first freighter flying the Stars and Stripes to leave on a transatlantic voyage in nearly 40 years. The vessel was built at Toledo, Ohio, for the ocean trade several years ago.

ESTABLISHED 1855

# THE IRON AGE

Published Every Thursday by the

David Williams Company

239 West 39th Street New York

W. H. Taylor - *President and Treasurer*
I. A. Mekeel - - - *First Vice-President*
Fritz J. Frank - - - - - *Secretary*
M. C. Robbins - - - *General Manager*

Editors

Geo. W. Cope A. I. Findley W. W. Macon

Charles S. Baur - - *Advertising Manager*

Branch Offices

Chicago: Otis Building Philadelphia: Real Estate Trust Bldg.
Pittsburgh: Park Building Cleveland: American Trust Building
Boston: Compton Building Cincinnati: Mercantile Library Bldg.

Entered at the New York Post Office as Second-class Mail Matter

Subscription price: United States and Mexico, $5.00 per year; to Canada, $7.50 per year; to other foreign countries, $10.00 per year.

CONTENTS.

Saving Space in a Steel Warehouse..... 1421
Lantern Slides to Assist Sales..... 1422
An Important Southern Ore Field..... 1423
National Tube Company's Safety Calendar..... 1423
Illinois Central's Co-operative Education Plan..... 1424
The Blair Patented Removable Slag Pocket..... 1424
A New Flask for Dry Sand Molding..... 1425
Lifting Magnets ..... 1425
High Speed Sensitive Drilling Machine..... 1426
Piece-Work and the Race Problem..... 1427
Large Orders for Mesta Gas Engines..... 1427
Cementation of Steel by the Use of Gases..... 1428
Production System for a 200-Employee Plant..... 1430
The General Electric Company's Erie Foundries..... 1434
American Effort in South Africa..... 1434
Progress in Steel Making in Alabama..... 1436
Manufactures in Our Foreign Commerce..... 1438
Savings by Oxy-Acetylene Welding ..... 1439
International Steam Pump Company's Year..... 1439
Gas and Oil Power Practice in Europe..... 1440
Correspondence ..... 1443
Cambria Steel Company's Coke Contracts..... 1444
Mill Scale as a Cause of Pitting..... 1445
Steel Corporation Iron Ore Output..... 1445
The Violation of Sales Contracts..... 1446
The Human Factor in Shop Operation..... 1447
Bettering First Aid to the Injured..... 1447
Factor in Steel Tariff Readjustment..... 1448
The Steel Corporation's Labor Policy..... 1448
The New Benson Concentrating Plant..... 1448
New Open Hearth Furnaces..... 1448
The New Industrial Commission ..... 1449
A New Mexican Iron and Steel Project..... 1449
The Chicago Steel Products Company..... 1449
The Iron and Metal Markets..... 1450
Personal ..... 1462
Obituary ..... 1462
Cleveland Metal Trades Meeting and Banquet..... 1463
Pittsburgh and Vicinity Business Notes..... 1463
Baltimore Business and Industrial Notes..... 1464
New Tools and Appliances..... 1465
The American Iron and Steel Association's Statistical Work.. 1465
Customs Decisions ..... 1465
Notes on Drop-Forging Practice..... 1466
New Process Gear Corporation..... 1467
The Machinery Markets ..... 1468
Trade Publications ..... 1476

## The Violation of Sales Contracts

The wide announcement of the suit of the Cambria Steel Company against a Connellsville coke company brings forward prominently the subject of the violation of sales contracts in the iron and related trades. The Cambria Company claims heavy damages from the coke company for the failure of the latter to make deliveries as specified in two contracts. The steel company was obliged to enter the market and purchase coke at a much higher price than named in the contracts.

Coke companies have been conspicuous offenders in times like the present when activity in the steel trade has so greatly increased the consumption of coke as to tax the facilities of the producers. The temptation has been strong to neglect the requirements of consumers with contracts placed at low prices while trade was comparatively quiet and to take advantage of the opportunity to get more money from those whose necessities compel them to enter the market. Some of the coke producers have had salutary lessons in the past and possibly these companies are not now offenders. A case is called to mind which happened a few years ago when, under conditions like the present, a large consumer of coke who had been unable to secure deliveries on a contract, the excuse of lack of cars being given, set detectives at work and found the delinquent company making regular shipments of its product to other parties from whom it was getting much higher prices. Suit was brought for damages, the facts were duly presented at the trial, and the coke company was mulcted in the full amount claimed. That the lesson thus given was not learned by others is shown by the numerous complaints now heard of violations of coke contracts.

Pig iron manufacturers and steel makers have suffered doubly from the too frequent disposition to violate sales contracts by those with whom they have dealings. Not only do they find difficulty in keeping coke producers to the terms of their contracts when the demand for coke is urgent, but they have also been greatly offended against by consumers of their product in times of falling prices. At such times, as has frequently been set forth in these columns, consumers of pig iron and of finished products have failed to take out the quantities contracted for, giving various excuses for violation of their agreements. Some consumers have boldly demanded that contracts be readjusted on a lower basis, alleging that if they were compelled to adhere strictly to the terms of the agreement they would be unable to compete with other manufacturers who were buying at a lower price. Others have been less frank, resorting to various subterfuges for the purpose of evading the necessity of taking in the material bought. Some have been known to offer additional contracts at lower prices on condition that the quantities due them on the old contract were made part of the total of the new one at the lower price.

The steel manufacturers themselves are not without blame in the infringement of contracts which they have made for the delivery of material and have then found an abrupt change in the market bring about much higher prices. In the past few months numerous complaints have been heard among consumers of plates, sheets, bars and other finished products having contracts placed early in the year when prices were much lower. They have been unable to secure

the quantities which were to be delivered under the terms of the contracts, and instances have been brought to our notice of complete inattention to repeated requests for more regular shipments. It is alleged that some of those who are receiving premiums on prompt shipments of steel products have been disposing of material in this way that should have gone to regular customers having contracts of a character that would seem to afford no opportunity for such an evasion of a plain obligation.

The violation of commercial contracts, it would appear, is altogether too common for men of the high standing now prevailing in the American iron trade. Obligations of other kinds are rigidly adhered to. The standard of honesty and fair dealing is high. Never before were greater efforts made to attain quality in the products turned out. In view of such conditions it is lamentable that in this one respect there should be such a lapse of commercial honor.

## The Human Factor in Shop Operation

At a time when so much attention is being given to the more effective management of manufacturing companies, there are indications that in a good many cases the human element is overlooked. As has been often pointed out, it receives less attention than in former days even in the smaller establishments. An important metal working company in the West recently took up the keying-up idea and employed an expert to work it out. With few exceptions the workmen resented the presence of a man with a stop watch, their particular grievance being, apparently, that no explanation had been made of what was being attempted. The results were much short of what the management expected, and the case gives a good deal of room for conjecture as to what might have been the outcome had the superintendent been given authority to take his men into his confidence.

The management of another western plant depends on its general superintendent to get results, and looks to him entirely. Over 500 men are employed, the majority of whom are skilled workmen. An interview with the superintendent and a trip through the plant with him revealed in part the secret of his success in getting the desired results. His appearance in the main shop caused none of the speeding-up motions sometimes seen, nor any of the usual side remarks between workmen, although he was also accompanied by the general manager. The superintendent stopped a planer operator probably a minute to inquire as to the condition of his boy who had been injured in a street car accident and was in a hospital. Another man was asked how he was progressing with his motor. He had invented a gasoline motor, and had made a model of it at home. He was told by the superintendent that when it came to applying for patent papers he would show him how to get them at the least possible cost to be protected. A third stop was made to give some quiet instructions to a new lathe hand, that were more in the nature of suggestions.

This particular superintendent is no marked exception to the general rule. A foreman, in a side conversation, remarked that "he surely can use 'language' when a piece of work is spoiled by carelessness, but it is all threshed out in his private office." It was intimated that as a rule in such cases the man goes back to his machine with the determination to get better results, and at least with the feeling that the superintendent has his personal interests at heart.

From some sources the inquiry will promptly come, perhaps with a touch of cynicism, as to the output in dollars per man per year under this system. Investigation of this feature brought out the fact that it was considerably above the average. The superintendent laughingly remarked that his work was entirely in the hands of his men, and that he frequently discussed with them the great difficulty the management had in keeping the balance on the right side of the ledger. The feeling was such that they did not consider such talk preliminary to a reduction in wages, but simply a discussion between two men vitally interested in the success of the business.

The human element in shop management cannot well be diagrammed, but it must have a larger place than it has been given in some analyses of shop operation. It always comes out strong in discussions of scientific systems of paying for shop work; but in practice the disposition is to depend on systems for what only men of the right kind can do. The two examples we have given from contemporary experience could no doubt be duplicated many times over.

## Bettering First Aid to the Injured

In a great many manufacturing plants no provision is made for expert first aid to the injured. Nowadays most works are equipped with cabinets containing the various dressings, antiseptic solutions, tourniquet, etc., because the laws of many States require these very essential accessories, together with directions as to what should be done in time of emergency. In few places, however, excepting some of the larger plants which employ a physician regularly, is there any one on the ground to give that immediate attention to an injured employee which is often of vital importance if life or limb is to be saved or if the loss of time resulting from injury is to be reduced to the shortest possible period. Some years ago a wave of interest in first aid to the injured swept over the country. The public schools took up the work and apprentices and others employed in shops and factories were instructed in the simpler forms of surgical assistance. To-day in the great majority of cases the training is wholly superficial and desultory.

In one large plant the work is detailed to the foreman of each department. The foremen were first called together and a series of lectures given in which the more common types of serious injury were described and discussed and their immediate treatment outlined. The subjects included sprains, fractures, dislocations, abrasions, contusions, lacerations, hemorrhages, burns and electric shock. After the lectures the foremen were invited to ask questions, and all matters about which misconception existed were explained thoroughly. Afterwards the men were examined and given a series of practical tests in bandaging, applying the tourniquet and splinting arms and legs.

To train one or two individuals in small works or in each department of larger establishments is no costly or difficult task. A surgeon can put the little class through a course of instruction in a short time. The expense is small; in fact, it is negligible, taking into account the saving which may accrue not only in the efficiency of the injured man by insuring his early return to his work, but in the losses resulting from the payment of compensation under the liability acts.

These laws provide a certain period, ranging from a week to two weeks following an accident, for which time the injured man is not entitled to recompense from the employer. In a great majority of cases where expert attention has been given injured employees the time lost is less than this limit; the percentage is much higher when injuries are not attended to immediately and skillfully.

In factories where the work has been organized and the responsibility vested in individual men, first-aid methods are often antiquated. The present-day surgeon knows a great deal that is of practical value in this work which was not taught by his predecessors of a generation or even a decade ago, and he should be given the opportunity to bring shop methods up to date. Take, for example, the treatment of lacerated wounds, which form the bulk of the accident work and vary from slight cuts of the fingers to severe injuries of the hands. The old approved method of treating these injuries is to scrub them with soap and water, using a sterile nail brush, then to wash them in bichloride of mercury and afterwards wash off with sterile water. This treatment is effective but painful. It sometimes kills already partly devitalized tissues and in some cases requires an anaesthetic before thorough cleansing is possible without unbearable pain. One company which has been using the gasoline and iodine method of cleansing for the past year has not had a case of infected wound. The method is to wash thoroughly the injured part in gasoline, with gauze, thus removing rapidly all dirt and grease. The wound and surrounding parts having thus been cleansed, the wound and adjacent skin are painted with two or more coats of tincture of iodine. The wound is then sutured or dressed, as the surgeon sees fit. This is but an example of the possibilities which are now open to the shop man in taking care of injured employees.

## Factors in Steel Tariff Readjustment

At the dinner at Johnstown, Pa., December 5, given to several steel company presidents, William H. Donner, president of the Cambria Steel Company, spoke of the effect of tariff revision on conditions in the steel industry. He said he had no fear of disastrous results, believing that neither the President nor the next Congress would knowingly permit anything to be done which would injure the steel business or other lines of industry. Of the wage and price factors in the steel tariff problem he said:

"Wages in America from the mine to finished steel are higher in every instance than in England or in Germany and yet a very unusual condition exists in the steel business today and one that might be very misleading if not intelligently considered. Prices are lower in America than in Europe where the demand for steel is enormous, so that at this moment the tariff on steel is unnecessary, but the thinking business man knows that this is an unnatural and only the temporary condition, which will be reversed when the English and German markets are normal, and which will change very materially during their periods of depression. I cannot conceive how any consumer can legitimately claim that he is being injured by the tariff on steel.

"I heard a man recently state that the steel works of America are so superior to those of Europe that the latter cannot compete. Such talk is nonsense. There are just as well equipped plants in Germany as in America, and they cost less money to build because they have cheaper labor.

"The consumption of steel in periods of prosperity and depression is probably more seriously affected than that of any other manufactured product, and the European manufacturers would undoubtedly be very glad when their business is slack to dump their surplus production into America at cost in order to maintain their organizations and help carry fixed charges. America is the largest producer of steel in the world today and we want to maintain our supremacy. It will, of course, require time for foreign countries to increase their production and supersede us, and we must not lend any encouragement in that direction."

## The Steel Corporation's Labor Policy

Col. H. P. Bope, first vice-president of the Carnegie Steel Company, addressed the Rochester, N. Y., Chamber of Commerce at a dinner held December 14. He dwelt particularly on the labor side of the steel industry and the measures in the interest of its employees which the United States Steel Corporation had made effective. The familiar accident benefit, pension, stock-owning and other features of the Steel Corporation's policy were referred to at length. Some extracts are given below:

"A steel mill under the very best possible conditions is not a parlor nor are the men who work there parlor gentlemen. They are strong, sturdy, intelligent workmen, who are recognizing that which is being done for them and are accepting it in the same broad, generous spirit in which it is offered. That we shall ever produce ideal conditions is perhaps doubtful, but no more are those prevailing in the cab of the locomotive or the engine room of the great ship. Whose voice is raised in behalf of the firemen in the engine rooms of the great liners, and yet the steel worker's labor is easy compared with theirs. Our men know that the officials of the corporation are thinking and planning in their interest and appreciate it. If there are any complaints theirs is the voice to speak, not that of the muckraker and the would-be philanthropist, many of whom have never been inside of a steel mill." * * *

"The Steel Corporation is spending each year for the betterment of its workmen not less than $5,000,000. It may challenge comparison in amount and method with any other corporation, in any other line of business."

"Not the least of the means employed by the corporation to enlarge its business has been the treatment of the small consumer. Recognizing that in this wonderful age of progress and rapid growth a small purchaser may soon develop into a larger and therefore more profitable one, special attention has been given to the welfare of such buyers."

As to the practical working out of the Steel Corporation's accident relief policy, Colonel Bope cited the fact that in 1911 it was sued in only two-tenths of 1 per cent. of the accident cases. Accident relief costs the corporation $2,000,000 every year. The establishment of the six-day week was spoken of as one of the most difficult of all the measures adopted to promote the welfare of employees. "Except under conditions of extreme necessity, as in breakdowns or absolutely needed repairs, every employee is required to rest one day in seven, and hours of labor are so arranged that this has become a perfectly practical measure, although it entailed a large curtailment of production, and met with opposition from many of the men themselves, who preferred to labor to obtain the additional compensation."

## The New Benson Concentrating Plant

The new iron ore concentrating plant at the properties of the Benson Mines Company, Benson Mines, N. Y., was put in operation last week and the first product was shipped a few days ago. Nearly two years have been spent in the extended development of the property, which is located in Lawrence County, N. Y., and contains extensive deposits of magnetite running about 30 per cent. metallic iron. The concentrating plant recently completed will have a capacity of 400 tons per day, doubling the output of the old mill. Water power is obtained from a source recently developed on the Oswegatchie River, about four miles from the ore property, furnishing about 8000 hp. The concentrated ore is of Bessemer grade, and is being sold in the Eastern markets by Pilling & Crane, Philadelphia.

**New Open Hearth Furnaces.**—The John A. Roebling's Sons Company, Trenton, N. J., has under construction an extension to its open hearth department, consisting of three 40-ton furnaces. The plant as now operated consists of six 30-ton open hearth furnaces, four acid and two basic.

## The New Industrial Commission

WASHINGTON, D. C., December 17.—President Taft today transmitted to the Senate the names of nine men to make up the Commission on Industrial Relations created by the act of Congress of August 23, "to discover the underlying causes of dissatisfaction in the industrial situation." It is believed that all will be confirmed and that the commission will begin its work early in the new year. The commission has broad powers and an almost unlimited field of inquiry, and President Taft and Secretary Nagel believe that it can make important investigations and valuable recommendations to Congress looking to changes in the conditions between employees and employers.

The commission, by the act creating it, is authorized "to hold sittings and public hearings anywhere in the United States, to send for persons and papers, to administer oaths, to summon and compel the attendance of witnesses and to compel testimony and to employ such secretaries, experts, etc., as shall be necessary to carry out the purposes of the act." Its work is outlined in section 4 of the act, which is in part as follows:

That the commission shall inquire into the general condition of labor in the principal industries of the United States including agriculture, and especially in those which are carried on in corporate forms; into existing relations between employers and employées; into the effect of industrial conditions on public welfare and into the rights and powers of the community to deal therewith; into the conditions of sanitation and safety of employees and provisions for protecting the life, limb, and health of the employees; into the growth of associations of employers and wage earners and the effect of such associations upon the relations between employers and employees; into the extent and results of methods of collective bargaining; into any methods which have been tried in any State or in foreign countries for maintaining mutually satisfactory relations between employees and employers; into methods for avoiding or adjusting labor disputes through peaceful and conciliatory mediation and negotiations; into the scope, methods, and resources of existing bureaus of labor and into possible ways of increasing their usefulness.

The sum of $100,000 is made available for the work of the commission after its members have been confirmed and it has been organized. Following is the commission as submitted by President Taft: United States Senator George Sutherland, of Utah; George B. Chandler, a member of the Connecticut Legislature; Charles S. Barrett, Atlanta, Ga., president Farmers' Union; F. A. Delano, Chicago, president Wabash Railroad Company; Adolph Lewisohn, New York, merchant and manufacturer; F. C. Schwedtman, St. Louis, electrical engineer; A. B. Garretson, Iowa, president Railway Conductors' Association; John B. Lennon, Chicago, treasurer American Federation of Labor; James O'Connell, District of Columbia, vice-president American Federation of Labor.

The act required the President to select three representatives of employers, three of employees and three others. The first three named above are unclassified, the next three are representatives of employers and the last three are representatives of employees. W. L. C.

## A New Mexican Iron and Steel Project

CITY OF MEXICO, MEXICO, December 12.—The Consolidated Rolling Mills & Foundries Company, S. A., has been organized here with a capital stock of $3,000,000 and has taken over the properties and business of the Consolidated Iron & Equipment Company, S. A., Valley Metal Company, S. A., American Tank & Culvert Company, Culchon Sanitario, S. A., and Garage Mexicana, S. A. The consolidated company has purchased a large tract of land adjoining the plant of the former Consolidated Iron & Equipment Company, S. A., and has already begun the erection of a rolling mill which will have a large output of merchant bar iron and steel, light rails, beams and other structural shapes and concrete bars.

The officers of the new company are: Harry Wright, president; A. Weill, vice-president; George W. Cook, vice-president; Eman L. Beck, vice-president; Burton W. Wilson, secretary; M. H. Kayser, treasurer; P. W. Monroe, comisario. Mr. Wright, the president, has been identified with the iron and steel industry of Mexico for a number of years. Mr. Weill is vice-president of the Mexico City Banking Company, and president of the American Bank Company of Guadalajara. Mr. Cook is one of the leading merchants of this city. Mr. Beck is president of the Mexico City Banking Company. Mr. Wilson is a well-known American attorney here. Mr. Wright will also occupy the position of general manager of the company. Mr. Weill will be assistant manager.

The rolling mill will be under the charge of N. A. Becker and assistants. The brass and white metal foundries will be under Charles G. Seigert as general manager, and the machine shops under E. C. Littlewood as superintendent, assisted by Manuel Teran as foreman. The tank and culvert department will be in charge of T. J. White. The cotton waste and mattress business will be under the charge of Fidelina Martinez.

## The Chicago Steel Products Company

The Chicago Steel Products Company has been organized to take over the steel fabricating plant formerly owned by Geo. W. Jackson, Inc., and located on Elston avenue, Chicago, on the North Branch of the Chicago River. For the past year this plant has been operated as the North works of the Vierling Steel Company under lease. The new company has a capital stock of $300,000 and has issued serial bonds to the amount of $200,000 running 20 years. The officers of the company are: John G. Kreer, president; C. H. Wilcox, secretary and treasurer; W. B. Kilgore, superintendent. Mr. Kreer has been connected with the Vierling Steel Company and was previously associated with Joseph T. Ryerson & Son.

In the immediate future the company will be engaged in the fabrication of steel car bodies and transmission towers. The building of steel barges is under consideration. The company also has a unique plan whereby it will fabricate standard columns, girders and trusses, together with their standard connection, and will issue a hand book tabulating the fabricated material thus held in stock, the hand book showing blue prints and templates. It is the intention to develop the general merchandizing of fabricated standard structure members to meet the engineering requirements of many architects now lacking adequate engineering facilities. The plant acquired by this company has a very complete and well balanced equipment and its general facilities should afford every opportunity for rapid growth.

---

The Warren Iron & Steel Company, Warren, Ohio, has been reorganized. A block of its stock has been purchased by Samuel Siddall, who was the active head of the Empire Iron & Steel Company and the Barry Iron & Steel Company, Niles, Ohio, merged some time ago in the Brier Hill Steel Company. Mr. Siddall will be secretary and treasurer of the Warren Iron & Steel Company. D. L. Helman will continue as president and general manager, while C. B. Loveless, who retires from the office assumed by Mr. Siddall, retains his official interest in the corporation and will serve as vice-president. The company manufactures crucible and open hearth steel, rolls saw and shovel plate and also makes a specialty of disks and colters for agricultural implements and steel heads for land rollers.

---

The Wheeling & Lake Erie Railroad is in the market for 1500 50-ton steel hopper cars and 20 locomotives, the Federal Court having authorized W. M. Duncan, Cleveland, Ohio, the receiver, to purchase this equipment for which receiver's certificates will be issued. Application was made for permission to purchase 3000 cars but the court cut the number in half. However, authority to purchase additional cars may be secured later. Other improvements authorized were the rebuilding of the ore handling plant at Huron, Ohio, and the installation of new power equipment and two 15-ton ore buckets, and the rebuilding and repair of several bridges. The expenditure for new rolling stock and for improvements will aggregate about $2,500,000.

---

With the blowing in of No. 1 furnace of the Rogers-Brown Iron Company at Buffalo, N. Y., which is to occur the last week in December, all four of the company's stacks will be in operation simultaneously for the first time. When the two new furnaces were completed and placed in operation early this year the two older stacks were blown out for repairs one at a time. The engines, blowing pumps, hoisting machinery, etc., of Nos. 1 and 2 furnaces have been completely overhauled and are now practically as good as new.

# The Iron and Metal Markets

## Large Harriman Rail Order

### Car Buying Heavy After a Lull

### Wire Products $1 a Ton Higher—The Structural Outlook Promising

Railroad buying stands out strongly in the developments of an ordinarily quiet time of the year. The Harriman lines, which in the past 12 months have placed in successive orders a total of 123,000 tons of rails in addition to their original contract for 1912, have now closed for 200,000 tons for 1913. This represents the total of the Southern Pacific and Union Pacific—110,000 tons for the former—and the San Pedro and other related lines. It develops that a number of Eastern and other roads that have placed orders for next year will make further purchases, in most cases for new construction, renewals having already been provided for. The Southern Railway has just given a supplemental order for 5000 tons of Bessemer rails to the Maryland Steel Company.

The inability of European rail mills to take any considerable further business for 1913 will bring a large Brazilian order for Bessemer rails to this country. First deliveries are wanted in July. Chili has made a contract calling for September rolling. South Australia is in the market for 19,000 tons.

The week's car buying has been heavy, with a total of 13,000 to 15,000. The alternation of activity and dullness in the car market reflects the maneuvering of the railroads over prices. Car companies are getting more money on recent contracts, but there is still active competition. On some contracts work will last over seven or eight months, but builders are promising deliveries in three or four months in some cases. Norfolk & Western, B. & O., Pennsylvania and New York Central inquiries make a large total. The Steel Corporation will probably buy 3000 cars this week. Estimates of orders expected within a month range from 43,000 to 53,000.

Car works have placed large orders with various steel companies in the past week, deliveries on some Chicago business extending over the third quarter and in one case into the fourth. Mills receiving such business make a better report concerning the recent volume of new business than those depending largely on some other lines of product. There is thus simultaneously testimony that both new business and specifications have fallen off and that new orders are more than shipments, while specifications have approached some of the high records of the year.

Prices of finished steel in 1913 promise to continue substantially on to-day's basis and consumers are working out of the strain they have been under in getting material. Steel supply will gradually increase; for example, the Steel Corporation will have nearly 100,000 tons a month greater steel capacity by the end of the first quarter.

The one definite advance in prices for the week was $1 a ton in wire products, announced by the leading producer, effective December 16; but this was in reality bringing its price up to what had previously been asked by several other manufacturers. An advancing tendency is noticed also in steel hoops. On the other hand, some concessions appear in bolts, shafting and wrought pipe.

The structural situation continues very promising. In New York City the way is rapidly being cleared for the early placing of the contracts for subway extensions, which should give the rolling mills some spring work on contracts calling for 750,000 to 800,000 tons in the next five years. For new buildings of the Crucible Steel Company of America, 3500 tons has been let and at Chicago 3600 tons of bridge work for the St. Louis & San Francisco. The National Biscuit Company has bought 3600 tons of steel for extensions in New York City.

In shipments and new orders the highest November record of the American Sheet & Tin Plate Company was made last month. The increase in business in both sheets and tin plates this year has been enormous. Only eight months ago the great over supply of capacity in both lines was referred to as a handicap to be reckoned with indefinitely.

Canadian prosperity is seen in the effort of one consuming interest there to secure 12,000 tons a month of finished material in this country, against former purchases of 2000 to 3000 tons. European mills had been approached in vain. British buyers of semi-finished steel are complaining of non-deliveries on both German and American contracts. British plate buyers also have a grievance against American mills which have failed to deliver.

Continued quietness in the pig iron market has brought out some reports of weakness. As far as these relate to the resale of Southern iron at $13.50, Birmingham, for No. 2, they represent a condition present for several weeks. A new development, however, is the offering of foundry iron by two Eastern steel companies, one of which was a vigorous seller last year. On the other hand, several Central Western furnaces are kept out of commission from lack of coke and in that section Northern iron is strongly held.

An interesting feature of the old material market is the selling of old car wheels at Philadelphia for export to Canada and Europe, one Canadian shipment amounting to 1000 tons. There has been good buying of car wheels in the Pittsburgh district also.

## A Comparison of Prices

**Advances Over the Previous Week in Heavy Type. Declines in Italics.**

At date, one week, one month and one year previous.

| | Dec. 18, 1912. | Dec. 11, 1912. | Nov. 20, 1912. | Dec. 20, 1911. |
|---|---|---|---|---|
| **Pig Iron,** Per Gross Ton: | | | | |
| Foundry No. 2 X, Philadelphia. | $18.50 | $18.50 | $18.25 | $14.85 |
| Foundry No. 2, Valley furnace.. | **17.50** | 17.00 | 17.00 | 13.00 |
| Foundry No. 2, S'th'n, Cin'ti... | 17.25 | 17.25 | 17.25 | 13.25 |
| Foundry No. 2, Birmingham, Ala. | 14.00 | 14.00 | 14.00 | 10.00 |
| Foundry No. 2, furnace, Chicago* | 18.00 | 18.00 | 18.00 | 14.00 |
| Basic, delivered, eastern Pa.... | 18.25 | 18.25 | 18.25 | 14.25 |
| Basic, Valley furnace..... | 16.50 | 16.50 | 16.50 | 12.25 |
| Bessemer, Pittsburgh ..... | 18.15 | 18.15 | 18.15 | 15.15 |
| Malleable Bessemer, Chicago... | 18.00 | 18.00 | 18.00 | 14.35 |
| Gray forge, Pittsburgh..... | 17.15 | 17.15 | 16.75 | 13.40 |
| Lake Superior charcoal, Chicago | 18.75 | 18.75 | 18.75 | 16.50 |
| **Billets, etc.,** Per Gross Ton: | | | | |
| Bessemer billets, Pittsburgh.... | 27.00 | 27.00 | 27.00 | 19.00 |
| Open hearth billets, Pittsburgh. | 27.50 | 27.50 | 27.50 | 19.00 |
| Forging billets, Pittsburgh..... | 34.00 | 34.00 | 34.00 | 25.00 |
| Open hearth billets, Philadelphia | 32.00 | 32.00 | 32.00 | 21.40 |
| Wire rods, Pittsburgh ..... | 30.00 | 30.00 | 30.00 | 24.50 |
| **Old Material,** Per Gross Ton: | | | | |
| Iron rails, Chicago..... | 17.25 | 17.25 | 18.00 | 14.70 |
| Iron rails, Philadelphia..... | 18.00 | 18.00 | 19.00 | 16.00 |
| Car wheels, Chicago ..... | 17.00 | 17.00 | 17.00 | 13.00 |
| Car wheels, Philadelphia..... | **18.00** | 15.50 | 15.00 | 12.50 |
| Heavy steel scrap, Pittsburgh... | 14.75 | 14.75 | 15.00 | 12.25 |
| Heavy steel scrap, Chicago..... | 12.50 | 12.50 | 13.50 | 10.25 |
| Heavy steel scrap, Philadelphia | 14.50 | 14.50 | 15.50 | 12.25 |

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

| Finished Iron and Steel, Per Pound to Large Buyers: | Dec. 18, 1912. Cents. | Dec. 11, 1912. Cents. | Nov. 20, 1912. Cents. | Dec. 20, 1911. Cents. |
|---|---|---|---|---|
| Bessemer rails, heavy, at mill | 1.25 | 1.25 | 1.25 | 1.25 |
| Iron bars, Philadelphia | 1.67½ | 1.67½ | 1.67½ | 1.25 |
| Iron bars, Pittsburgh | 1.70 | 1.70 | 1.65 | 1.25 |
| Iron bars, Chicago | **1.57½** | 1.55 | 1.55 | 1.15 |
| Steel bars, Pittsburgh, future | 1.40 | 1.40 | 1.40 | 1.15 |
| Steel bars, Pittsburgh, prompt | 1.70 | 1.70 | 1.60 | 1.15 |
| Steel bars, New York, future | 1.56 | 1.56 | 1.56 | 1.31 |
| Steel bars, New York, prompt | 1.86 | 1.86 | 1.76 | 1.31 |
| Tank plates, Pittsburgh, future | 1.45 | 1.45 | 1.45 | 1.15 |
| Tank plates, Pittsburgh, prompt | 1.75 | 1.75 | 1.60 | 1.15 |
| Tank plates, New York, future | 1.61 | 1.61 | 1.61 | 1.31 |
| Tank plates, New York, prompt | 1.91 | 1.91 | 1.76 | 1.31 |
| Beams, Pittsburgh, future | 1.45 | 1.45 | 1.45 | 1.15 |
| Beams, Pittsburgh, prompt | 1.75 | 1.75 | 1.70 | 1.15 |
| Beams, New York, future | 1.61 | 1.61 | 1.61 | 1.31 |
| Beams, New York, prompt | 1.91 | 1.91 | 1.86 | 1.31 |
| Angles, Pittsburgh, future | 1.45 | 1.45 | 1.45 | 1.15 |
| Angles, Pittsburgh, prompt | 1.75 | 1.75 | 1.70 | 1.15 |
| Angles, New York, future | 1.61 | 1.61 | 1.61 | 1.31 |
| Angles, New York, prompt | 1.91 | 1.91 | 1.86 | 1.31 |
| Skelp, grooved steel, Pittsburgh | 1.45 | 1.45 | 1.45 | 1.15 |
| Skelp, sheared steel, Pittsburgh | 1.50 | 1.50 | 1.50 | 1.20 |
| Steel hoops, Pittsburgh | 1.50 | 1.50 | 1.50 | 1.25 |
| **Sheets, Nails and Wire,** | | | | |
| Per Pound to Large Buyers: | Cents. | Cents. | Cents. | Cents. |
| Sheets, black, No. 28, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.90 |
| Wire nails, Pittsburgh | **1.75** | 1.70 | 1.70 | 1.55 |
| Cut nails, f.o.b. Eastern mills | 1.75 | 1.75 | 1.75 | ... |
| Cut nails, Pittsburgh | 1.70 | 1.70 | 1.70 | 1.50 |
| Fence wire, ann'l'd, 0 to 9, P'gh. | **1.55** | 1.50 | 1.50 | 1.35 |
| Barb wire, galv., Pittsburgh | **2.15** | 2.10 | 2.10 | 1.90 |
| **Coke, Connellsville,** Per Net Ton, at Oven: | | | | |
| Furnace coke, prompt shipment | $4.00 | $4.00 | $3.85 | $1.60 |
| Furnace coke, future delivery | 3.25 | 3.25 | 3.00 | 1.65 |
| Foundry coke, prompt shipment | 4.50 | 4.50 | 4.25 | 1.90 |
| Foundry coke, future delivery | 4.00 | 4.00 | 3.75 | 2.15 |
| **Metals,** | | | | |
| Per Pound to Large Buyers: | Cents. | Cents. | Cents. | Cents. |
| Lake copper, New York | *17.62½* | 17.75 | 17.75 | 14.00 |
| Electrolytic copper, New York | *17.37½* | 17.50 | 17.62½ | 13.87½ |
| Spelter, St. Louis | *7.15* | 7.20 | 7.35 | 6.15 |
| Spelter, New York | *7.30* | 7.35 | 7.50 | 6.30 |
| Lead, St. Louis | *4.17½* | 4.20 | 4.50 | 4.35 |
| Lead, New York | *4.32½* | 4.35 | 4.65 | 4.45 |
| Tin, New York | **49.87½** | 49.25 | 49.65 | 45.00 |
| Antimony, Hallett, New York | *9.37½* | 9.50 | 9.75 | 7.75 |
| Tin plate, 100-lb. box, Pittsburgh | $3.60 | $3.60 | $3.60 | $3.40 |

## Finished Iron and Steel f.o b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.70c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

| Extras. | Cents per lb. |
|---|---|
| Gauges under ¼ in. to and including 3-16 in. | .10 |
| Gauges under 3-16 in. to and including No. 2 | .15 |
| Gauges under No. 8 to and including No. 9 | .25 |
| Gauges under No. 9 to and including No. 10 | .30 |
| Gauges under No. 10 to and including No. 12 | .40 |
| Sketches (including straight taper plates) 3 ft. and over | .10 |
| Complete circles, 3 ft. in diameter and over | .20 |
| Boiler and flange steel | .10 |
| "A. B. M. A." and ordinary firebox steel | .20 |
| Still bottom steel | .30 |
| Marine steel | .40 |
| Locomotive fire box steel | .50 |
| Widths over 100 in. up to 110 in., inclusive | .05 |
| Widths over 110 in. up to 115 in., inclusive | .10 |
| Widths over 115 in. up to 120 in., inclusive | .15 |
| Widths over 120 in. up to 125 in. inclusive | .25 |
| Widths over 125 in. up to 130 in., inclusive | .50 |
| Widths over 130 in. | 1.00 |
| Cutting to lengths or diameters under 3 ft. to 2 ft., inc. | .25 |
| Cutting to lengths or diameters under 2 ft., to 1 ft., inc. | .50 |
| Cutting to lengths or diameters under 1 ft. | 1.55 |

No charge for cutting rectangular plates to lengths 3 ft. and over.

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. and over, and zees, 3 in. and over, 1.45c. to 1.70c. Other shapes and sizes are quoted as follows:

| | Cents per lb. |
|---|---|
| I-beams over 15 in. | 1.50 to 1.55 |
| H-beams over 18 in. | 1.50 to 1.55 |
| Angles over 6 in. | 1.50 to 1.55 |
| Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card, Sept. 1, 1909 | 1.50 to 1.55 |
| Tees, 3 in. and up | 1.50 to 1.55 |
| Angles, channels and tees, under 3 in. plus full extras as per steel bar card, Sept. 1, 1909 | 1.50 to 1.55 |
| Deck beams and bulb angles | 1.75 to 1.80 |
| Hand rail tees | 2.20 to 2.30 |
| Checkered, trough and corrugated floor plates | 2.35 to 2.55 |

*Extras for Cutting in Length.*

| | Cents per lb. |
|---|---|
| Under 3 ft., to 2 ft. inclusive | .25 |
| Under 2 ft., to 1 ft. inclusive | .50 |
| Under 1 ft. | 1.55 |

No charge for cutting to lengths 3 ft. and over.

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (card weight) in effect from September 10, 1912, one point greater being allowed on merchant weight; iron pipe (full weight), from October 21, 1912:

*Butt Weld.*

| Steel. Inches. | Black. | Galv. | Iron. Inches. | Black. | Galv. |
|---|---|---|---|---|---|
| ⅛, ¼ and ⅜ | 72 | 52 | ⅛ and ¼ | 67 | 48 |
| ½ | 76 | 66 | ⅜ | 66 | 47 |
| ¾ to 3 | 79 | 71 | ½ | 70 | 57 |
| | | | ¾ to 2½ | 73 | 62 |

*Lap Weld.*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 76 | 68 | 1¼ | 57 | 46 |
| 2½ to 6 | 78 | 70 | 1½ | 68 | 57 |
| 7 to 12 | 76 | 66 | 2 | 69 | 59 |
| 13 to 15 | 53 | .. | 2½ to 4 | 71 | 62 |
| | | | 4½ to 6 | 71 | 62 |
| | | | 7 to 12 | 69 | 56 |

*Plugged and Reamed.*

| | | | | | |
|---|---|---|---|---|---|
| 1 to 3, butt | 77 | 69 | 1 to 1½, butt | 71 | 60 |
| 2, lap | 74 | 66 | 2, butt | 72 | 61 |
| 2½ to 4, lap | 76 | 68 | 1¼, lap | 55 | 44 |
| | | | 1½, lap | 66 | 55 |
| | | | 2, lap | 67 | 57 |
| | | | 2½ to 4, lap | 69 | 60 |

*Butt Weld, extra strong, plain ends.*

| | | | | | |
|---|---|---|---|---|---|
| ⅛, ¼ and ⅜ | 68 | 58 | ⅜ | 64 | 53 |
| ½ | 73 | 67 | ½ | 68 | 61 |
| ¾ to 1½ | 77 | 71 | ¾ to 1½ | 72 | 63 |
| 2 to 3 | 78 | 72 | 2 and 2½ | 73 | 64 |

*Lap Weld, extra strong, plain ends.*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 74 | 66 | 1¼ | 66 | 60 |
| 2½ to 4 | 76 | 68 | 2 | 67 | 59 |
| 4½ to 6 | 75 | 67 | 2½ to 4 | 71 | 62 |
| 7 to 8 | 68 | 58 | 4½ to 6 | 70 | 61 |
| 9 to 12 | 63 | 53 | 7 and 8 | 64 | 54 |
| | | | 9 to 12 | 59 | 48 |

*Butt Weld, double extra strong, plain ends.*

| | | | | | |
|---|---|---|---|---|---|
| ½ | 63 | 57 | ½ | 58 | 50 |
| ¾ to 1½ | 66 | 60 | ¾ to 1½ | 61 | 53 |
| 2 to 2½ | 68 | 62 | 2 to 2½ | 63 | 55 |

*Lap Weld, double extra strong, plain ends.*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 64 | 58 | 2 | 56 | 50 |
| 2½ to 4 | 66 | 60 | 2½ to 4 | 61 | 55 |
| 4½ to 6 | 65 | 59 | 4½ to 6 | 60 | 54 |
| 7 to 8 | 58 | 48 | 7 to 8 | 53 | 43 |

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

**Wire Rods and Wire.**—Bessemer, open hearth and chain rods, $30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.55; galvanized, $1.95. Galvanized barb wire, to jobbers, $2.15; painted, $1.75. Wire nails to jobbers, $1.75.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

*Plain Wire, per 100 lb.*

| Nos. | 0 to 9 | 10 | 11 | 12 & 12½ | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| Annealed | $1.70 | $1.75 | $1.80 | $1.85 | $1.95 | $2.05 | $2.15 | $2.25 |
| Galvanized | 2.10 | 2.15 | 2.20 | 2.25 | 2.35 | 2.45 | 2.85 | 2.95 |

**Boiler Tubes.**—Discounts on lap welded steel, in effect from January 1, 1913, and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

| *Lap Welded Steel.* | | *Standard Charcoal Iron.* | |
|---|---|---|---|
| 1¼ and 2 in. | 61 | 1½ in. | 46 |
| 2¼ in. | 58 | 1¾ to 2¼ in. | 48 |
| 2½ and 2¾ in. | 64 | 2½ in. | 53 |
| 3 and 3¼ in. | 69 | 2¾ to 3¼ in. | 55½ |
| 3½ to 4½ in. | 71 | 3½ to 5 in. | 58 |
| 5 and 6 in. | 64 | | |
| 7 to 13 in. | 61 | | |

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to desti-

nations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

**Sheets.**—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

*Blue Annealed Sheets*

| | Cents per lb. |
|---|---|
| Nos. 3 to 8 | 1.60 to 1.70 |
| Nos. 9 and 10 | 1.65 to 1.75 |
| Nos. 11 and 12 | 1.70 to 1.80 |
| Nos. 13 and 14 | 1.75 to 1.85 |
| Nos. 15 and 16 | 1.80 to 1.90 |

*Box Annealed Sheets, Cold Rolled.*

| | |
|---|---|
| Nos. 10 and 11 | 1.90 to 2.00 |
| No. 12 | 1.90 to 2.00 |
| Nos. 13 and 14 | 1.95 to 2.05 |
| Nos. 15 and 16 | 2.00 to 2.10 |
| Nos. 17 to 21 | 2.05 to 2.15 |
| Nos. 22 and 24 | 2.10 to 2.20 |
| Nos. 25 and 26 | 2.15 to 2.25 |
| No. 27 | 2.20 to 2.30 |
| No. 28 | 2.25 to 2.35 |
| No. 29 | 2.30 to 2.40 |
| No. 30 | 2.40 to 2.50 |

*Galvanized Sheets of Black Sheet Gauge.*

| | |
|---|---|
| Nos. 10 and 11 | 2.40 to 2.50 |
| No. 12 | 2.50 to 2.60 |
| Nos. 13 and 14 | 2.50 to 2.60 |
| Nos. 15 and 16 | 2.65 to 2.75 |
| Nos. 17 to 21 | 2.80 to 2.90 |
| Nos. 22 and 24 | 2.95 to 3.05 |
| Nos. 25 and 26 | 3.10 to 3.20 |
| No. 27 | 3.25 to 3.35 |
| No. 28 | 3.40 to 3.50 |
| No. 29 | 3.55 to 3.65 |
| No. 30 | 3.70 to 3.80 |

# Pittsburgh

PITTSBURGH, PA., December 18, 1912.

While there has been some falling off in the volume of specifications received so far by the steel mills in December, as compared with the previous great activity, a very encouraging feature of the situation is that several of the larger makers report an active inquiry for material for delivery in second and third quarters of next year. This is taken to mean that the trade still has faith in the future, and is willing to contract long ahead on the basis of to-day's prices. One large mill reports that it has entered a number of contracts for bars on the basis of 1.40c. and plates and shapes at 1.45c. for delivery in third quarter. The only change noted in prices during the week was an advance of $1 a ton in wire products, made by the American Steel & Wire Company, this action having been taken several months ago by two other leading interests.

**Pig Iron.**—The market has been very quiet the past week, consumers being covered over this month and pretty well through first quarter. A strong feature of the situation is that iron is being taken out very promptly, and in a good many cases the furnaces are being asked to anticipate shipments, showing that the metal is going into actual consumption. Prices are steady but give no indication of being higher in the near future, with the exception that No. 2 foundry for first quarter is held at $17.50 minimum, with two or three sellers quoting $18 at furnace. We quote standard Bessemer iron for first half delivery at $17.25; basic, $16.50; No. 2 foundry, $17.50 to $18; malleable Bessemer, $17 to $17.25; gray forge, $16.25 to $16.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton. A furnace in the Wheeling district reports sales of upward of 2000 tons of basic for first quarter at $16.50 at furnace.

**Billets and Sheet Bars.**—Since the announcement that one of the leading makers had fixed prices on sheet bars for first quarter, some heavy contracts have been made, and it is probable that within a few days all the leading steel mills will announce their prices for first quarter, as consumers are anxious to know what their steel is going to cost. Reports are that open hearth sheet bars for January delivery have sold above $29, maker's mill, but this is not confirmed. Very little steel is sold in the open market, as all consumers are covered by contracts on a sliding scale based on pig iron, or else on quotations from week to week. We make nominal quotations as follows: Bessemer billets, $27; Bessemer sheet bars, $27.50; open hearth billets, $27.50, and open hearth sheet bars, $28, f.o.b. mill, Pittsburgh or Youngstown. Forging billets are $34 or higher and axle billets are about $32 to $33, Pittsburgh.

**Ferroalloys.**—So far as known, no large contracts for ferromanganese have been made at $65, Baltimore, since this price was put out some days ago. Nearly all users are pretty well covered through first half, and while they are not getting as prompt deliveries as desired, they are not willing to contract at the new price. Carload lots for spot shipment continue to bring $75 to $76, Baltimore. We quote 80 per cent. English ferromanganeses for first half at $67 to $68; for second half, $65; and for spot shipment, $75, all at Baltimore. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh. We quote 10 per cent. at $24; 11 per cent., $25; 12 per cent., $26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

**Steel Rails.**—No important contracts for standard sections have been placed, but railroads are specifying freely against their contracts in order to get places on rolling schedules. Work is being pushed actively on the new mill to roll standard sections now being built by the Carnegie Steel Company at Bessemer, but it will hardly be in operation until late in the summer. The new demand and specifications against contracts for light rails are active. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c., 16 and 20 lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

**Wire Rods.**—Inquiries are out for 2000 to 3000 tons of Bessemer and open hearth rods for delivery in first quarter. The advance in wire products is not so far reflected in rods, which are still held at $30, Pittsburgh, for Bessemer and open hearth.

**Muck Bar.**—There is no new inquiry. No sales have been reported in this market for some time. We quote standard grades, made from all pig iron, at $31 to $31.50, Pittsburgh.

**Skelp.**—The mills are receiving liberal specifications but no large contracts have been placed the past week. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.87½c., delivered at buyers' mills in the Pittsburgh district.

**Plates.**—Recent orders for steel cars include 4000 for the Missouri, Kansas & Texas; 2200 for the Chicago, Rock Island & Pacific; 4500 for the Illinois Central and 1000 for the Monon. The Harriman Lines are said to have placed 3000 additional cars with the Pullman Company and the Haskell & Barker Car Company. The New York Central is also reported to have ordered 500 more. It is estimated that the total orders for cars since July 1 aggregate about 110,000, a considerable increase over the first half of the year. The two local car companies report that deliveries of bars and plates by the mills are very unsatisfactory, thus restricting the production of cars. A leading plate mill outside the Pittsburgh district is holding sheared plates at 1.55c. at mill, for delivery in four to six weeks and is getting pretty good business at this price. We quote ¼-in. and heavier tank plates at 1.45c. to 1.50c., Pittsburgh, for delivery at convenience of the mill, which would be not before second quarter and possibly third quarter, while for delivery in four to six weeks from 1.55c. to 1.60c. is quoted, and for shipment in two weeks 1.75c. to 1.80c. can be had.

**Structural Material.**—Local fabricators are pretty well filled through the first quarter or longer, and are not actively bidding on new work. The McClintic-Marshall Construction Company has taken 300 tons for a new building for the Scoville Mfg. Company, Waterbury, Conn., and about 400 tons of bridge work for an Eastern road. We quote beams and channels up to 15-in. at 1.45c. for delivery at the convenience of the mill, while small lots for delivery in two to four weeks are bringing from 1.75c. to 2c. or higher.

**Car Wheels.**—The new demand for steel car wheels is active. The Carnegie Steel Company has taken an order for 500 for passenger service for the Boston Elevated. We quote 33-in. wheels for freight service at $15 to $15.50 and 36-in. for passenger cars at $19 to $19.50 per wheel, f.o.b. Pittsburgh.

**Iron and Steel Bars.**—This year will close with makers of iron and steel bars having contracts on their books which, if specified for, will take the greater part of their output for the first half of 1913, particularly steel bars. New buying in the past month or so has been only fairly active, large consumers being well covered for six to nine months ahead. All records for output and shipments of both iron and steel bars have been broken this year. The great activity in the bar iron trade has resulted in a number of long idle plants being started up, and the output of iron bars

at present is heavier than at any time for five or six years. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which means second or third quarter of next year, while for fairly prompt shipment 1.60c. to 1.75c. is readily paid by consumers, and in a few cases even higher prices have been paid. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt shipment. Mills charge $1 extra per ton for twisting ¼ in. and larger steel bars and $2 extra for ½ to ⅝ in.

**Sheets.**—The new demand continues quite active. Since opening its books for contracts for second quarter of next year the American Sheet & Tin Plate Company has booked a number of heavy orders. All the mills are back in deliveries from four to eight weeks, and on certain grades of sheets as much as 12 weeks. The shortage in supply of steel has been more severely felt the past week and is seriously interfering with operations. One leading mill announces that on account of the heavy volume of business it has already booked for first and second quarters and the active inquiries pending, it has advanced its prices to the basis of 1.75c. for blue annealed, 2.30c. for No. 28 black and 3.40c. for No. 28 galvanized. The market is very strong on the basis of 1.65c. for Nos. 9 and 10 blue annealed sheets, 2.25c. for No. 28 black sheets and 3.40c. for No. 28 galvanized.

**Tin Plate.**—In November the American Sheet & Tin Plate Company broke all its records for a similar period in shipments of tin plate. The season is pretty well over, and new buying is dull, but all the mills have booked heavy contracts for delivery in first and second quarters, while in some cases contracts run for delivery over all the year. Two of the leading mills report that they have the greater part of their output for the first nine months of 1913 under contract. We quote 100 lb. cokes at $3.60 and 100 lb. coke ternes at $3.45 f.o.b. Pittsburgh.

**Spelter.**—The market has eased off and prices are slightly lower. We quote prime grades of Western at 7.20c., East St. Louis, equal to 7.32½c., Pittsburgh.

**Railroad Spikes.**—No notable new orders have been placed lately, but the railroads continue to specify very freely against contracts, and all the spike makers are back in deliveries from four to six weeks, and in small spikes for a longer period. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.90 and small railroad and boat spikes at $1.90 and $2 per 100 lb., f.o.b. Pittsburgh, for forward delivery. Small spikes have sold as high as $2.25 for prompt shipment.

**Hoops and Bands.**—There is not much new buying, as consumers are covered ahead. One leading maker has its product in both hoops and steel bands pretty well under contract for first half of 1913. Prices are firm. We quote steel bands at 1.40c. to 1.45c., with extras as per the steel bar card and hoops at 1.50c., Pittsburgh, for shipment through first half of next year.

**Bolts and Rivets.**—The new demand is heavy, and some makers state that they are back from eight to ten weeks in deliveries. We have revised prices on the basis of the advance reported last week and now quote button head structural rivets at $2.20 and cone head boiler rivets at $2.30 per 100 lb. The new discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

| | |
|---|---|
| Coach and lag screws | 80 and 10% off |
| Small carriage bolts, cut threads | 75 and 5% off |
| Small carriage bolts, rolled threads | 75 and 10% off |
| Large carriage bolts | 70% off |
| Small machine bolts, rolled threads | 75, 10 and 5% off |
| Small machine bolts, cut threads | 75 and 10% off |
| Large machine bolts | 70 and 7% off |
| Machine bolts with C.P.C. and T nuts, small | 75 and 5% off |
| Machine bolts with C.P.C. and T nuts, large | 70% off |
| Square hot pressed nuts, blanked and tapped | $5.70 off list |
| Hexagon nuts | $6.30 off list |
| C.P.C. and R. square nuts, tapped and blank | $5.70 off list |
| Hexagon nuts ⅜ and larger | $6.60 off list |
| Hexagon nuts smaller than ¾ | $7.20 off list |
| C.P. plain square nuts | $5.20 off list |
| C.P. plain hexagon nuts | $5.50 off list |
| Semi-finished hexagon nuts ¾ and larger | 85% off |
| Semi-finished hex. nuts smaller than ¾ | 85 and 10% off |
| Rivets, 7/16 x 6½, smaller and shorter | 75, 10 and 10% off |
| Rivets, metallic tinned, bulk | 3½c. per lb. net extra |
| Rivets, tin plated, bulk | 1½c. per lb. net extra |
| Rivets, metallic tinned, packages | 70, 10 and 10% off |

**Wire Products.**—Effective Monday, December 16, the American Sheet & Tin Plate Company announced an advance of $1 a ton in wire products. This had been expected by the trade for some time. It is understood that nearly all consumers contracted for several months' requirements prior to the advance, and makers state that specifications are coming in freely but new demand is quiet, as the consumption of wire and wire nails is rather light at present. We quote wire nails at $1.75 per keg; cut nails, $1.70 per keg; galvanized barb wire, $2.15 per 100 lb.; painted, $1.75; annealed fence wire, $1.55, and galvanized fence wire, $1.95, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

**Shafting.**—New demand is rather quiet, as consumers have covered ahead. They continue to specify quite freely against contracts. We quote cold rolled shafting at 60 per cent. off in carload and 55 per cent. in less than carloads delivered in base territory.

**Merchant Steel.**—The new demand continues fairly heavy, with specifications against contracts coming in very freely. Several makers state that their output for first quarter is under contract and that they are back in deliveries from four to six weeks or longer. Prices are firm. We quote: Iron finished tire, 1½ x ⅜ in. and larger, 1.40c. to 1.55c., base; under 1½ x ⅜ in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, ¾, ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoes, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

**Tubular Goods.**—The National Tube Company, Pittsburgh, has issued a corrected list on boiler tubes to become effective January 1, and which is given on a previous page. Under these new discounts the prices figure out about the same as before, and while the new discount on 2¼-in. steel tubes has been advanced from 62 off to 58 off, the net price is within a fraction of a cent of being the same. The new demand for merchant pipe has quieted down, but some very heavy oil and gas projects are under way, and it is said that inquiries mostly from the Standard Oil Company and affiliated interests are in the market for fully 40,000 tons, deliveries to start early next year. The Midway Natural Gas Company of California, which laid a 12-in. gas line in that State about a year ago and followed with a 16-in. line, is considering the building of another 16-in. line, but the definite inquiry has not as yet come out. A number of leading makers of charcoal iron boiler tubes have decided to adopt the list weights and list prices on steel tubes recently anounced by the National Tube Company to become effective January 1. All the iron and steel pipe mills are now preparing new discount cards, effective January 1. The new demand for locomotive and merchant tubes is quiet, consumers being covered for several months ahead. All the pipe and tube mills look for a very active trade next year, based on the heavy inquiry that is already out.

**Iron and Steel Scrap.**—The market is quiet, preceding the holiday and inventory period, and very little scrap is being sold by dealers to consumers. While the tone of the market on scrap for delivery in January and February is possibly a little firmer, it is weak for December delivery and it is almost impossible to sell any material for shipment this month at any price. Consumers will soon take stock and close accounts for this year and will not now take in more than absolutely necessary. Scrap that is loaded on cars and has to be moved is usually sold at a sacrifice. One leading consumer has offered $15 for a round tonnage of selected heavy steel scrap for delivery in January and February, but the offer has been without takers. Dealers quote, per gross ton, as follows:

| | |
|---|---|
| Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery | $14.75 to $15.00 |
| No. 1 foundry cast | 14.50 to 14.75 |
| No. 2 foundry cast | 13.50 to 13.75 |
| Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district | 12.75 to 13.00 |
| Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. | 16.25 to 16.50 |
| No. 1 railroad malleable stock | 14.25 to 14.50 |
| Grate bars | 10.75 to 11.00 |
| Low phosphorus melting stock | 18.25 to 18.50 |
| Iron car axles | 24.25 to 24.75 |
| Steel car axles | 17.75 to 18.00 |
| Locomotive axles, steel | 21.75 to 22.00 |
| Locomotive axles, iron | 27.75 to 28.00 |
| No. 1 busheling scrap | 14.25 to 14.50 |
| No. 2 busheling scrap | 9.75 to 10.00 |
| Old car wheels | 15.75 to 16.00 |
| *Cast iron borings | 9.90 to 10.00 |
| *Machine shop turnings | 10.50 to 10.75 |
| †Sheet bar crop ends | 16.50 to 16.75 |
| Old iron rails | 16.25 to 16.50 |
| No. 1 railroad wrought scrap | 15.00 to 15.25 |
| Heavy steel axle turnings | 12.75 to 13.00 |
| Stove plate | 10.75 to 11.00 |

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

**Coke.**—New inquiry for furnace coke for prompt shipment is light, indicating that consumers are getting quick deliveries on their contracts. One leading maker has closed a contract for 5000 tons a month for first half at the reported price of $3.25 per net ton at oven. Prices are firm. We quote standard makes of furnace coke for prompt shipment at $4 per net ton at oven, but sales of about 6000 tons are reported at a slightly lower figure. We quote standard makes of furnace coke on contracts for first half at $3.25, but it is stated that there is coke available for this delivery at about $3.15 at oven. Foundry coke for prompt shipment is ruling strong at $4.50 to $4.75 at oven. We quote best makes of 72-hour on contracts for first half at about $3.75 at oven. The Connellsville Courier reports the output of coke in the Upper and Lower Connellsville regions last week as 393,000 net tons, a decrease over the previous week of about 7000 tons. It is believed that coke will be scarcer in January than it is now, owing to the holidays, which will further reduce the output.

## Philadelphia

PHILADELPHIA, PA., December 17, 1912.

The demand for iron and steel products continues good but pig iron has been quieter. Prices throughout are well maintained. Mill operations continue at full capacity, with a strong pressure for deliveries. Some moderate export business in plates has been closed and negotiations for billets for export are still pending. Car builders continue active inquirers for material. In many cases a cessation of active buying would be appreciated, giving mills an opportunity to satisfy customers and lessen the strain that operations have been under. The old material market is weak and irregular, although an active export movement in old wheels has developed. Coke is a trifle more active.

**Iron Ore.**—The market is quieter, although important negotiations are pending in Lake, local and Canadian ores. Importations during the week include 24,550 tons from Cuba, 10,300 tons from Newfoundland, 4900 tons from New Brunswick and 2600 tons from Venezuela. Importations in 1912 will show an increase over the totals for last year and exceed former records at this port. The total thus far this year shows approximately 1,252,953 tons.

**Pig Iron.**—Some movement is observed in low grade iron for prompt and first quarter delivery. Sales of 5000 tons to an interior cast iron pipe maker and several 1000-ton lots to nearby Delaware River pipe foundries have been closed. The aggregate will probably reach 15,000 tons, at prices ranging from $17.50 to $17.75, delivered, according to grade. In the higher foundry grades business has been light, some sellers reporting the quietest week in months. Such sales as were made were mostly for 1913 shipment, at full prices, namely, $18.50 minimum for standard analysis eastern Pennsylvania No. 2 X foundry. Two steel companies, the Worth Brothers Company and the Bethlehem Steel Company, who have an excess of furnace capacity operative, have entered the market for foundry iron orders but no price concessions have been heard. Moderate sales of Virginia foundry iron have been made here at $16, furnace, for No. 2 X for first quarter and $15.50 for second quarter. Sales of 500-ton lots for Western and New England shipment have been made on the same basis. Rolling mill forge is uncalled for and is nominally quoted at $17.75, delivered. No sales of either basic or low phosphorus iron have been announced but it is reported that one melter is quietly in the market for 1000 tons of basic for early delivery. Consumers are pressing strongly for deliveries on contracts, particularly in foundry grades, and producers find it hard to satisfy their trade owing to the meager stocks on furnace yards. Additional capacity is preparing to go in, although the most of the furnaces that will become active are small. Inquiries have been lighter in all grades. An occasional round lot for extended shipment, such as the last half, comes out, but the majority of producers confine business to the first half. Quotations for standard brands, delivered in buyers' yards in this district, ranging up to the end of the first quarter and in exceptional instances for the first half, are about as follows:

| | |
|---|---|
| Eastern Pennsylvania No. 2 X foundry | $18.50 to $18.75 |
| Eastern Pennsylvania No. 2 plain | 18.25 to 18.50 |
| Virginia No. 2 X foundry | 18.80 to 19.00 |
| Virginia No. 2 plain | 18.55 to 18.75 |
| Gray forge (nominal) | 17.75 |
| Basic (nominal) | 18.25 |
| Standard low phosphorus | 24.00 to 24.50 |

**Ferroalloys.**—No sales of ferromanganese have been made at the higher basis of quotations for either first or second half delivery. An element of uncertainty still surrounds prices, which are nominally quoted at seaboard as follows: Prompt, $75; first half, $67 to $70; last half, $65. Odd lot sales of ferrosilicon are noted, but the demand is light. Importations of ferromanganese at this port last week aggregated 764 tons.

**Billets.**—Heavy inquiries for both rolling and forging billets are coming to Eastern mills, while a large amount of business is still under negotiation. Some mills refuse to quote, not having opened books for the second half of next year and being pretty well covered for the first half. With some makers export inquiries have received no attention. Orders for fair contracts for the first half have been entered, but there is a sharp scarcity of material for early delivery. Prices are firm. $32, delivered, being named for basic open hearth rolling billets for first or second quarter shipment. Forging billets are quoted at $36, mill, minimum for ordinary specifications and delivery.

**Plates.**—Eastern makers continue to enter a large volume of business, usually in excess of the productive rate. Contracts expiring with the year end are being heavily specified against and will no doubt be fully taken. Orders for new car work, together with extensive specifications, have been entered. Several moderate orders for export have been booked at full domestic quotations. No falling off in the miscellaneous demand is apparent, and while business can be placed at 1.65c., delivered, subject to ability of the mill to ship, current orders and contracts for first quarter are freely entered at 1.75c. for sheared and 1.80c. for universal plates, delivered in this district.

**Structural Material.**—There is a sharp scarcity of plain shapes in some sizes for early or near future shipment, and considerable work is reported delayed by fabricators owing to non-delivery of material. Eastern mills are well sold up for prompt or first quarter shipment. The Phoenix Bridge Company has the contract for 7000 tons of material for pier work in Boston, but the bulk of the business entered has been confined to small orders in both plain and fabricated material. Prices are firm, but cover a wide range dependent on shipment. Plain shapes for extended forward shipment may be had at 1.60c. to 1.65c. For first quarter or half 1.70c. to 1.75c. is quoted, while for prompt delivery in this district as high as 2c., mill, has been named.

**Sheets.**—Consumers are making strong efforts to have Eastern mills accept contracts covering requirements for next year, but so far no business has been entered for delivery beyond July 1, and this is more extended than these mills usually make. The current demand is good. Prices are unchanged, but very firm, with prompt deliveries commanding sharp premiums. Western sheets for early delivery are scarce. No. 10 blue annealed Western sheets, delivered here, are quoted at 1.80c., while Eastern mills making smooth, loose rolled sheets obtain 2.05c., delivered, for reasonable shipment.

**Bars.**—No difficulty is experienced in obtaining 1.85c., delivered, for steel bars for prompt shipment, considerable business being put through on that basis. For extended shipment 1.55c. to 1.60c. can be done. A moderate volume of business is moving in iron bars. Eastern mills continue to name ordinary iron bars at 1.67½c., minimum, delivered, for ordinary shipments, but for early deliveries 1.77c. to 2c. is quoted.

**Coke.**—The demand is irregular and prices show variation. Contract furnace coke for the full year is quoted at $3.25 at oven. For the first half, moderate contracts have been closed at prices ranging from $3 to $3.50, dependent on grade, while prompt coke has been sold at $3.85. Foundry coke has been quiet. The following range of quotations, per net ton, delivered in this district, is named:

| | |
|---|---|
| Connellsville furnace coke | $5.00 to $5.75 |
| Connellsville foundry coke | 5.85 to 6.50 |
| Mountain furnace coke | 4.50 to 5.25 |
| Mountain foundry coke | 5.60 to 6.10 |

**Old Material.**—Sales of old car wheels for export are reported. One 1000-ton lot for Canadian and a 400-ton lot for European shipment have been sold on a basis of better than $16, delivered here. Very little business has developed in melting steel or rolling mill grades. Occasional odd lot purchases, usually a trifle below market quotations, are made by consumers, who are pretty well supplied and take on only bargain lots. A light volume of business is expected until after the turn of the year. Meanwhile both buyers and sellers are awaiting developments. Prices are irregular, forced

sales being freely made at concessions from regular quotations, which, for delivery in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to $1.35 per gross ton, range about as follows:

| | |
|---|---|
| No. 1 heavy melting steel (prompt) | $14.50 to $15.00 |
| No. 1 heavy melting steel (first quarter) | 15.00 to 15.50 |
| Old steel rails, rerolling (nominal) | 17.00 to 17.50 |
| Low phosphorus heavy melting steel scrap | 19.00 to 19.50 |
| Old steel axles | 20.00 to 20.50 |
| Old iron axles (nominal) | 26.00 to 27.00 |
| Old iron rails | 18.00 to 18.50 |
| Old car wheels | 16.00 to 16.50 |
| No. 1 railroad wrought (nominal) | 16.25 to 16.75 |
| Wrought iron pipe | 13.50 to 14.00 |
| No. 1 forge fire | 13.50 to 14.00 |
| No. 2 light iron (nominal) | 8.00 to 8.50 |
| Wrought turnings | 11.00 to 11.50 |
| Cast borings | 10.75 to 11.25 |
| Machinery cast | 15.00 to 15.50 |
| Grate bars, railroad | 11.50 to 12.00 |
| Stove plate | 11.50 to 12.00 |
| Railroad malleable (nominal) | 13.50 to 14.00 |

# Chicago

CHICAGO, ILL., December 18, 1912—(*By Telegraph*).

In the light of orders placed in the past week, the probability of a diminished tonnage showing for December is greatly modified. From some reports a decrease in specifications for various forms of steel to the extent of from 25 to 40 per cent. is noted. On the contrary, the specifications booked by the leading interest approach the largest weekly totals of the year and additional orders in sight to be closed before January 1 promise to maintain that average. This is the more significant because the business is distributed over nearly all forms of material. The pig iron situation is less clearly defined and the current lack of demand has made the market less aggressively firm, particularly for prompt shipment iron. At the same time liberal buying in January for first half requirements will be a necessity at the current rate of consumption. Additional orders for several thousand cars are noted, and such pig iron inquiry as is reported is largely for charcoal and malleable iron. Scrap iron prices continue weak with a very limited demand for material.

**Pig Iron.**—The pig iron market is generally flat, with little inquiry for Southern iron, but a somewhat better situation as regards spot shipments, for which a minimum of $14 is generally obtainable. Local firms are figuring on an inquiry for 2500 tons of charcoal iron and on another for 1000 tons of malleable. Several smaller inquiries are also noted. It is understood that the 5000 tons of basic for St. Louis delivery has been purchased and at a price below the basis of $18 f.o.b. Chicago furnace. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being about 50c. a ton. Other quotations are for Chicago delivery. Prices on prompt shipment are as follows:

| | |
|---|---|
| Lake Superior charcoal, Nos. 1, 2, 3, 4 | $18.75 to $19.75 |
| Northern coke foundry, No. 1 | 18.50 to 18.75 |
| Northern coke foundry, No. 2 | 18.00 to 18.25 |
| Northern coke foundry, No. 3 | 17.50 to 18.00 |
| Southern coke, No. 1 foundry and No. 1 soft | 18.85 to 19.35 |
| Southern coke, No. 2 foundry and No. 2 soft | 18.35 to 18.85 |
| Southern coke, No. 3 | 17.85 to 18.35 |
| Southern coke, No. 4 | 17.35 to 17.85 |
| Southern gray forge | 17.35 to 17.85 |
| Southern mottled | 16.85 |
| Malleable Bessemer | 18.00 to 18.25 |
| Standard Bessemer | 19.40 to 19.90 |
| Basic | 17.75 to 18.25 |
| Jackson Co. and Kentucky silvery, 6 per cent | 20.40 |
| Jackson Co. and Kentucky silvery, 8 per cent | 21.40 |
| Jackson Co. and Kentucky silvery, 10 per cent | 22.40 |

*(By Mail)*

**Rails and Track Supplies.**—Orders for track fastenings have constituted a considerable proportion of the week's specifications, and the railroads are now taking rails for which the mills did not expect a call until spring. The week's sales also included some new rail tonnage. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, $32 to $34.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—The largest fabricating contract of the past week carried 3600 tons of trusses and girders for the St. Louis & San Francisco Railroad and was awarded to the McClintic-Marshall Construction Company and the Virginia Bridge Company. The Cambria Steel Company will furnish 5000 channels weighing 1614 tons to the Illinois Central Railroad. The St. Louis & San Francisco also let contract for 900 tons of bridge steel to the American Bridge Company. Other orders included 219 tons of miscellaneous steel for the new coke oven plant of the By-Product Coke Corporation at South Chicago and 132 tons for the Chicago, Rock Island & Pacific coaling stations. The demand for building material is good. Car steel specifications continue to be received. The Missouri Pacific is understood to have closed for 4000 cars, and there are still 11,000 cars for which steel is expected to be placed before the close of the year in this market. From this source alone will emanate fully 125,000 tons of materials. We quote for Chicago delivery from mill, on plain shapes, 1.63c.

For structural shapes in particular, warehouse stocks continue to be the principal source of prompt shipments and the volume of orders is unabated. Quotations are unchanged on the basis of 2.05c.

**Plates.**—A review of the several weeks during which premium prices for prompt shipment plates have been asked indicates that the tonnage sold at these higher prices was an unimportant proportion of the total mill sales. Not only was the total capacity of the mills offering this tonnage very limited but the promptness with which shipments were made evidenced that the orders placed were easily handled. The general mill situation, while more favorable as regards plates than structural shapes, is no easier. We quote for mill shipment, Chicago delivery, 1.63c.

At current prices plates can be obtained from store, particularly for local delivery, where the shipment is required within three weeks, on quite as good a basis as from mill with the situation increasingly favorable to the warehouse as the time of delivery is shortend. We continue to quote for base sizes, $2.05.

**Sheets.**—The opening of the books of the largest producer for the second quarter on the basis of 2.25c. for No. 28 black and 3.40c. for galvanized established the nominal market. These prices are almost entirely nominal, however, because of deliveries, as current orders for shipment in the first half bring out prices $2 a ton higher. A moderate amount of tonnage from mill is offering for fairly prompt shipment, particularly of special shets. Prices have been changed and we quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.43c. to 2.53c.; No. 28 galvanized, 3.58c. to 3.68c.; No. 10 blue annealed, 1.83c. to 1.88c.

For sheets out of store we quote as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.80c., and No. 28 galvanized, 4.05c.

**Bars.**—The market for iron bars is now firmer than at any time and it is extremely doubtful that even the most favorable specifications could be placed at prices as low as 1.55c. Some large inquiries now in the market are failing to bring out better quotations than 1.57½c., while on less desirable business the best price is 1.62½c. Quotations on a Government inquiry for ⅝-in. twisted steel bars in small quantity include mill propositions offering 1.40c. with delivery in from four to seven months; approximately 1.70c., delivery 90 days, and 1.85c., delivery 75 days, base. From store the price was 2.02½c. and the delivery 1 day. The shafting market is beginning to feel the influence of higher bar prices and is firming up. We quote for mill shipment as follows: Bar iron, 1.55c. to 1.60c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

Delivery of bars out of store is now immediate in most sizes. The demand for reinforcing bars has been extended by favorable weather conditions, but the seasonable decline is somewhat in evidence. Shafting out of store is very firm and some of the jobbers have advanced their price two points though 55 off can still be done. For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 55 per cent. off.

**Rivets and Bolts.**—Prices for machine and carriage bolts and for hot pressed nuts have been advanced $1 a ton and new quotations for rivets are based on 2.20c., Pittsburgh, for structural rivets. In this market one maker is filled up for the first half. Current orders are not large and are generally to fill specific requirements. We quote from mill as follows: Carriage bolts up to ⅝ x 6 in. rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine bolts up to ⅝ in. x 4 in., rolled thread, 75-10-5; cut thread, 75-10; large sizes, 70-7½; coach screws, 80-10; hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Store prices for bolts and nuts have been correspondingly advanced and we quote as follows: Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ⅝ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ⅝ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, $5.30, and hexagon, $5.90 off per cwt.

**Wire Products.**—With the close of the season the trade in barb wire and fencing is very light. Manufacturers are taking the allotments of plain wire freely and the wire nail tonnage continues heavy. Prices have been advanced $1 a ton, which in effect is the withdrawal of our previous minimum quotations. We quote plain wire, No. 9 and coarser, base, $1.73; wire nails, $1.93; painted barb wire, $1.93; galvanized, $2.33; polished staples, $1.93; galvanized, $2.33, all Chicago.

**Cast Iron Pipe.**—The city of Seattle is in the market for about 3000 tons. Bids are to be opened December 30 for 1000 tons by St. Paul, Minn. As the result of recent financing, the city of La Crosse, Wis., completed its purchases with an order of 300 tons. Prices are unchanged. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $31; 6 to 12 in., $29; 16 in. and up, $28, with $1 extra for gas pipe.

**Old Material.**—The weakness of the general scrap market is unexpectedly prolonged. With the exception of old car wheels, of which sales of small tonnages to consumers at $17.25 are noted, and iron and steel car axles, the various grades of scrap offer little evidence of strength. The scarcity of labor has placed temporarily a premium on No. 2 railroad wrought as compared with No. 1, and instead of the usual differential of $1 per ton, No. 2 is now bringing prices within 50c. of No. 1. Cut forge is likewise affected. Consumers are still handicapped in their handling of incoming material, and for this reason, as well as their large stocks, are buying only in limited quantities. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

*Per Gross Ton.*

| | |
|---|---|
| Old iron rails | $17.25 to $17.75 |
| Old steel rails, rerolling | 16.25 to 16.75 |
| Old steel rails, less than 3 ft. | 14.50 to 15.00 |
| Relaying rails, standard section, subject to inspection | 24.00 |
| Old car wheels | 16.75 to 17.25 |
| Heavy melting steel scrap | 12.50 to 13.00 |
| Frogs, switches and guards, cut apart | 12.50 to 13.00 |
| Shoveling steel | 12.25 to 12.75 |
| Steel axle turnings | 11.00 to 11.50 |

*Per Net Ton.*

| | |
|---|---|
| Iron angles and splice bars | $16.00 to $16.50 |
| Iron arch bars and transoms | 16.50 to 17.00 |
| Steel angle bars | 12.50 to 13.00 |
| Iron car axles | 21.50 to 22.00 |
| Steel car axles | 18.00 to 18.50 |
| No. 1 railroad wrought | 12.75 to 13.25 |
| No. 2 railroad wrought | 12.25 to 12.75 |
| Cut forge | 12.25 to 12.50 |
| Steel knuckles and couplers | 12.75 to 13.25 |
| Steel springs | 13.25 to 13.75 |
| Locomotive tires, smooth | 14.00 to 14.50 |
| Machine shop turnings | 8.00 to 8.50 |
| Cast and mixed borings | 6.75 to 7.25 |
| No. 1 busheling | 11.25 to 11.75 |
| No. 2 busheling | 8.25 to 8.75 |
| No. 1 boilers, cut to sheets and rings | 9.50 to 10.00 |
| Boiler punchings | 12.50 to 13.00 |
| No. 1 cast scrap | 13.00 to 13.50 |
| Stove plate and light cast scrap | 10.75 to 11.25 |
| Railroad malleable | 13.50 to 14.00 |
| Agricultural malleable | 11.75 to 12.25 |
| Pipes and flues | 10.00 to 10.50 |

## Cleveland

CLEVELAND, OHIO, December 17, 1912.

**Iron Ore.**—The market is generally quiet. Some small lot sales were made and there are a few inquiries pending. Most consumers have bought at least a portion of their requirements for the coming year. We quote prices as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

**Pig Iron.**—The market on all grades is very quiet. A few sales of Northern foundry iron were reported in lots of 200 to 300 tons for early shipment and for first half delivery, but most consumers are covered until next July. Foundries will probably be slow in coming into the market for iron for the last half in view of the fact that prices are well up. Southern iron is still being offered at $13.50, Birmingham, for No. 2 for prompt shipment, but for first half delivery $14 appears to be well maintained as the minimum price. For prompt shipment and for the first half of 1913 we quote, delivered Cleveland, as follows:

| | |
|---|---|
| Bessemer | $18.15 |
| Basic | $17.40 to 17.75 |
| Northern No. 2 foundry | 17.75 to 18.00 |
| Southern No. 2 foundry | 18.35 to 18.85 |
| Gray forge | 17.00 to 17.25 |
| Jackson County silvery, 8 per cent. silicon | 20.55 to 21.55 |

**Coke.**—The Cleveland Furnace Company, which had an inquiry out for about 12,000 tons of furnace coke a month for the first half, has decided in view of the high prices asked not to buy for the present and to defer blowing in its second stack which it had planned to put in blast about January 1. The market is quiet. Some small contracts for foundry coke for first half have been closed at $4.25. We quote Connellsville furnace coke at $4 per net ton at oven for spot shipment and $3.25 for contract. Connellsville 72-hr. foundry coke is held at $4.50 and higher for prompt shipment and $4.25 to $4.50 for contract.

**Finished Iron and Steel.**—The pressure on the mills for material has eased up considerably. Consumers have gotten their stocks in better shape and are not urging shipments as hard as they were. The demand for early delivery has fallen off considerably and specifications on contracts are lighter. However, the easing of the situation has not yet resulted in improvement in deliveries. That the new demand is less active is attributed largely to the approach of the holiday season and inventory time. Some inquiry has come out for the last half of next year but local mill agencies have not opened their books for that delivery and some mills are inclined to defer doing so for some time in view of the fact that they have enough tonnage on their books to keep them busy well into the third quarter. Not much new structural inquiry is coming out, the most important work now pending being the completion of the Cleveland City Hall for which bids will be received this week. All prices are firm, with no change in quotations. Little material is to be had for delivery within the next 90 days except from jobbers' stocks. Iron bars are in good demand, with 1.60c. Cleveland the minimum quotation. Warehouse prices on steel bars are 2.10c. and on plates and structural material 2.25c.

**Old Material.**—There is little new demand and dealers are not expecting much buying until some time after the first of the year. Mills have been getting material in heavy volume the past few days and some are now asking that shipments be temporarily withheld. There is an abundance of scrap available, but dealers are not offering much of this at sacrifice prices, believing that better conditions will be found next month. The market generally is weak. Prices on borings, turnings, busheling and railroad wrought have been reduced 50c. or more a ton. We quote, f.o.b. Cleveland, as follows:

*Per Gross Ton.*

| | |
|---|---|
| Old steel rails, rerolling | $15.00 to $15.50 |
| Old iron rails | 17.50 to 18.00 |
| Steel car axles | 18.75 to 19.25 |
| Heavy melting steel | 13.50 to 14.00 |
| Old car wheels | 14.50 to 15.00 |
| Relaying rails, 50 lb. and over | 23.00 to 23.50 |
| Agricultural malleable | 12.50 to 13.00 |
| Railroad malleable | 14.00 to 14.50 |
| Light bundled sheet scrap | 12.50 to 13.00 |

*Per Net Ton.*

| | |
|---|---|
| Iron car axles | $21.00 to $22.00 |
| Cast borings | 7.75 to 8.00 |
| Iron and steel turnings and drillings | 8.00 to 8.50 |
| Steel axle turnings | 9.25 to 9.50 |
| No. 1 busheling | 11.50 to 12.00 |
| No. 1 railroad wrought | 13.50 to 14.00 |
| No. 1 cast | 13.00 to 13.50 |
| Stove plate | 10.00 to 10.50 |
| Bundled tin scrap | 11.00 to 11.50 |

## Cincinnati

CINCINNATI, OHIO, December 18, 1912.—(*By Telegraph.*)

**Pig Iron.**—While the market is steady, very little actual business is under negotiation. However, a northern Ohio melter is expected to close soon for 800 tons of Southern foundry iron for first half shipment, and a number of consumers in this immediate vicinity are open to offers on small lots for nearby delivery. It is reported that a few sellers have lately shaded the regular quoted price of $14, Birmingham basis, for No. 2 foundry, but this was on limited lots that were already en route, that holders were compelled to dispose of to avoid demurrage. It is possible to contract for delivery throughout the first half at $14, including some of the leading brands. Northern iron continues very strong, and while there is a small lot available for December shipment around $16.50, Ironton, the furnace price for either prompt or first half movement is $17. A sale of 500 tons of Jackson County 7 per cent. silvery iron is reported at $18.50 at furnace for last half shipment, and it is also stated that a few jobbing foundries have covered for a full year's supply of iron to cover contracts made on finished castings. There is some inquiry for charcoal iron but none for basic. Several furnaces in the Hanging Rock district have been compelled to shut down temporarily a number of times

lately, on account of delayed coke shipments. No malleable inquiries are out, nor do local agencies expect any demand from this source for several weeks at least. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

| | |
|---|---|
| Southern coke, No. 1 foundry and 1 soft | $17.50 to $17.75 |
| Southern coke, No. 2 foundry and 2 soft | 17.25 to 17.50 |
| Southern coke, No. 3 foundry | 17.00 to 17.25 |
| Southern, No. 4 foundry | 16.75 to 17.00 |
| Southern gray forge | 16.50 to 16.75 |
| Old silvery, 8 per cent. silicon | 20.20 to 20.70 |
| Southern Ohio coke, No. 1 | 18.70 to 19.20 |
| Southern Ohio coke, No. 2 | 18.20 to 18.70 |
| Southern Ohio coke, No. 3 | 17.95 to 18.45 |
| Southern Ohio malleable Bessemer | 17.70 to 18.20 |
| Basic, Northern | 18.20 to 18.70 |
| Lake Superior charcoal | 19.25 to 19.75 |
| Standard Southern car wheel | 27.25 to 27.75 |

*(By Mail)*

**Coke.**—Neither contract nor prompt shipment prices are firmly established in any one of the three fields reported from this office. Connellsville furnace coke for first and second quarter shipment can be contracted for around $3.25 to $3.50 per net ton at oven, but for nearby delivery is bringing from $4 to $4.50. Foundry coke is quoted about 25c. a ton higher, and there are the usual number of complaints as to delayed shipments. In the Wise County and Pocahontas fields there is a probability that first quarter contracts can be made a few cents below the figures named, but oven operators, as a rule, are not soliciting business, preferring to wait until after the holiday season.

**Finished Material.**—The local mill is quoting 2.35c. on No. 28 black sheets and 3.50c., Pittsburgh basis, on galvanized sheets. Specifications are still coming in in excess of the output, and deliveries cannot be promised under 10 to 12 weeks. As a matter of fact, sheet mills in this territory have about as many orders as they care to book for the first quarter. Structural material will doubtless be in excellent demand here the coming spring, as a number of large structures are planned, on which work will commence at an early date. Warehouse prices on steel bars are from 2.05c. to 2.15c., and on structural material all the way from 2.15c. to 2.25c., although on limited lots of material for quick delivery a small premium has been paid in a number of instances.

**Old Material.**—The market is about as dull as it has been during any given period for nearly a year. Few transactions are reported, and prices are weak. No change is expected until well along into next month, when the rolling mills should come out as buyers. The figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

*Per Gross Ton.*

| | |
|---|---|
| Bundled sheet scrap | $10.50 to $11.00 |
| Old iron rails | 14.25 to 14.75 |
| Relaying rails, 50 lb. and up | 21.25 to 21.75 |
| Rerolling steel rails | 13.25 to 13.75 |
| Melting steel rails | 11.25 to 11.75 |
| Old car wheels | 12.75 to 13.25 |

*Per Net Ton.*

| | |
|---|---|
| No. 1 railroad wrought | $11.25 to $11.75 |
| Cast borings | 7.25 to 7.75 |
| Steel turnings | 7.75 to 8.25 |
| No. 1 cast scrap | 11.00 to 11.50 |
| Burnt scrap | 7.75 to 8.25 |
| Old iron axles | 18.25 to 18.75 |
| Locomotive tires (smooth inside) | 12.00 to 12.50 |
| Pipes and flues | 7.75 to 8.25 |
| Malleable and steel scrap | 9.25 to 9.75 |
| Railroad tank and sheet scrap | 6.75 to 7.25 |

## St. Louis

ST. LOUIS, MO., December 16, 1912.

**Pig Iron.**—The sales of the week have been, for the most part, of the carload lot and 50-ton and 100-ton order, with an aggregate of good size, considering the period. The inquiry of last week for 5000 tons of basic developed into a contract for 6000 tons for delivery over the first half of the year, but the order went to a Chicago furnace at a price reported to be somewhat lower than the St. Louis representatives were willing to quote, though delivery is just across the river at Granite City. The largest inquiry out at the present time is one for 1000 tons of 8 per cent. silicon which is expected to be placed before the end of the week. Insistence on shipment as per contract continues and consumption is proceeding apparently unabated. Quotations here are $14 for prompt shipment No. 2 foundry, Birmingham basis, with prices for first quarter and second quarter running to $14.50 and $15, with the former as the prevailing figure. Ohio iron is quotable at $16.50 for No. 2 Ironton basis, and malleable and basic as well, with $18 as the figure at furnace for No. 2X at Chicago. Car shortage is reported worse than ever.

**Coke.**—Cars are hard to get and shipments are very irregular. Small lots are going at whatever price happens to be fixed by the urgency of the requirement. By-product coke continues on a parity with the Connellsville figures.

**Finished Iron and Steel.**—Demand for track fastenings continues surprisingly heavy for this season and the prices remain firm at last quotations. Fabricating shops are still specifying freely against contracts and apparently are keeping up their activity. Plates show no change. Bars are in active demand for construction purposes, while the agricultural and wagon interests are taking material as fast as they can get it from the mills. Generally the condition is regarded as good and there is no expectation other than that there will be renewed interest on the part of buyers after the first of the year.

**Old Material.**—The scrap market is still in a softening state, with prices showing no immediate evidence of an advance. The mills and foundries are not buying at present, but the railroads are not putting much forward in the way of old material, so that the dealers' yards are not being loaded up. There is, however, still an excellent inquiry for relaying rails and there is also still a shortage of supplies, making the demand hard to fill. The only list out during the week was one of 150 tons from the Vandalia. We quote dealers' prices, f.o.b. St. Louis, as follows:

*Per Gross Ton.*

| | |
|---|---|
| Old iron rails | $15.00 to $15.50 |
| Old steel rails, rerolling | 14.50 to 15.00 |
| Old steel rails, less than 3 ft. | 13.50 to 14.00 |
| Relaying rails, standard section subject to inspection | 23.50 to 24.50 |
| Old car wheels | 14.50 to 15.00 |
| Heavy melting steel scrap | 13.00 to 13.50 |

*Per Net Ton.*

| | |
|---|---|
| Iron fish plates | $12.50 to $13.00 |
| Iron car axles | 20.00 to 20.50 |
| Steel car axles | 16.00 to 16.50 |
| No. 1 railroad wrought | 12.00 to 12.50 |
| No. 2 railroad wrought | 11.75 to 12.25 |
| Railway springs | 11.50 to 12.00 |
| Locomotive tires, smooth | 13.00 to 13.25 |
| No. 1 dealers' forge | 9.50 to 10.00 |
| Mixed borings | 8.00 to 8.25 |
| No. 1 busheling | 11.00 to 11.25 |
| No. 1 boilers, cut to sheets and rings | 8.00 to 8.25 |
| No. 1 cast scrap | 12.00 to 12.50 |
| Stove plate and light cast scrap | 9.00 to 9.25 |
| Railroad malleable | 11.50 to 12.00 |
| Agricultural malleable | 10.00 to 10.50 |
| Pipes and flues | 8.00 to 8.25 |
| Railroad sheet and tank scrap | 7.50 to 8.00 |
| Railroad grate bars | 9.50 to 10.00 |
| Machine shop turnings | 9.00 to 9.50 |
| Bundled sheet scrap | 7.50 to 8.00 |

## Birmingham

BIRMINGHAM, ALA., December 16, 1912.

**Pig Iron.**—The local market is less buoyant than it has been, but furnacemen are not exercised over it, because they are well sold ahead into next year. Local consumers are equally well protected for some time to come. This status, coupled with the offerings of resale iron at $13.50, has had a slowing down tendency. Sales are scattered and in small lots. Pittsburgh and other Northern holders of warrant iron on Birmingham yards have made recent offers to brokers at $13.50, but the Southern consumers are so comfortable as to stocks that several of these proffers of 1000 tons each have not been exercised in this market. One large ironmaker is offering spot at $14 and will sell to its regular customers at that figure for the first quarter, while a considerable tonnage for first quarter could be secured from the same maker for $14.25. It is further understood that large orders covering the first half would be booked at $14.25. Another company, which adheres to $14.50 for first quarter and has heretofore quoted second quarter iron at $15, has tentatively accepted an offer of $14.50 for 600 tons for the first half. Therefore, it would appear that there is still a sizable quantity of $13.50 resale iron for disposal and that some concerns are more inclined to sell at $14 into the first quarter than heretofore. Otherwise, the market is as strong as ever. No change in the attitude of two of the largest makers quoting $14, $14.50 and $15 for spot and first and second quarters respectively has been reported. Some current sales

include 500 tons of No. 2 soft for first half at $14.50; 100 tons of No. 1 soft, spot delivery, at $14.75; 150 tons of No. 3 at $14.25; 250 tons of No. 2, first quarter, at $14.50, and 50 tons of No. 2, spot, at $14.50. Orders involving 5000 tons of silicon iron for first quarter were booked at $15 and small orders for Nos. 2, 3 and 4 have been booked on the $14.50 basis for first quarter. Charcoal iron is selling at $25, with $25.50 obtained for small lots. Prevailing quotations for spot and first quarter are as follows:

| | |
|---|---|
| No. 1 soft and foundry | $14.50 to $15.00 |
| No. 2 soft and foundry | 14.00 to 14.50 |
| No. 3 foundry | 13.75 to 14.25 |
| No. 4 foundry | 13.50 to 14.00 |
| Gray forge | 13.25 to 13.75 |
| Basic | 14.00 to 14.50 |
| Charcoal | 25.00 to 25.50 |

**Cast Iron Pipe.**—Orders received by the Birmingham pipe factories have been mainly small, but the prospect of sizeable contracts is reported as very good. The shops are busy, shipments being equal to the make, and the market is strong at $24.50 for 4-in. and $23 for 6-in and up, with $1 added for gas pipe.

**Coal and Coke.**—Coal is in acute demand, the supply being limited by scarcity of cars. Prices are high and firm. The bunker coal business at Mobile, New Orleans, etc., is increasing. The Pratt Consolidated Coal Company is building a 1000-ton collier at Mobile to take care of its port business there. Coke is very strong, foundry selling at $3.75 to $4.25 pet net ton at oven, with furnace ruling at $3 to $3.50. The Pratt Consolidated has fired up its ovens at Newcastle and will soon commence shipping on a 40,000-ton order for the steel plant at Monterey, Mexico, the coke going by all-rail route at the rate of 6000 tons per month. Other tentative coke contracts with Mexico and the Far West are reported, proper cars being the delaying factors.

**Old Material.**—Although business is active, trading is not so heavy as it was some time ago. Prices have not declined. Light cast and stove plate are in special demand. Prices f.o.b. cars at yards rule as follows, per gross ton:

| | |
|---|---|
| Old iron axles | $15.50 to $16.50 |
| Old steel axles | 15.50 to 16.00 |
| Old iron rails | 14.50 to 15.00 |
| No. 1 railroad wrought | 13.00 to 13.50 |
| No. 2 railroad wrought | 11.50 to 12.00 |
| No. 1 country wrought | 9.50 to 10.00 |
| No. 2 country wrought | 9.00 to 9.50 |
| No. 1 machinery cast | 11.50 to 12.00 |
| No. 1 heavy melting steel | 11.50 to 12.00 |
| Tram car wheels | 12.00 to 12.50 |
| Standard car wheels | 13.00 to 13.50 |
| Light cast and stove plate | 10.00 to 10.50 |

## San Francisco

SAN FRANCISCO, CAL., December 10, 1912.

Conditions in the local jobbing market are somewhat easier than for the last few months. Prices are well maintained, but the demand from small consumers has dropped off a little with the approach of winter, and continued heavy arrivals on old orders have given merchants ample stocks in nearly all lines. First quarter requirements, and in some cases those of the second quarter, have been fairly well covered, and specifications have fallen off materially. The large stock carried here by the United States Steel Products Company has been of material assistance to merchants during the period of shortage. The idea is gaining ground that prices have reached about the highest point, and dealers are disposed to be conservative in providing for the distant future. Large consumers, however, still have difficulty in getting deliveries, their current needs being rather above normal. European market conditions and high charter rates prevent any large import movement of steel products.

**Bars.**—The demand for reinforcing bars is picking up, a number of very large special inquiries being added to a strong demand in the regular building trade. Local mills are having some difficulty to keep up with orders, and agents for certain outside mills are refusing a large volume of business. The demand for soft steel bars is normal, but hardly as large as last month. Stocks in general are ample, but the local market is very short on some sizes. Prices stand as before, open-hearth reinforcing bars, car-loads, being quoted at 2.20c.; soft steel bars, jobbing lots, from store, at 2.65c.; and iron at 2.55c.

**Structural Material.**—The local building record for November was $1,912,932, a substantial gain over October as well as over November of last year. Oakland shows a similar gain, and Los Angeles is well ahead of last year, though Portland, Ore., made a poor showing. Fabricating business, however, is quiet, few buildings recently contracted requiring any large steel tonnage. A revival is expected after the first of the year, as several important jobs are being figured, and some with bids in are temporarily delayed. The only local contract worth mntioning is the Gump building, taken by Dyer Bros. A call for bids on the Oakland auditorium steel is expected before the end of the month. Preliminary drawings of the city hall steel are in the hands of contractors. Los Angeles will take bids December 20 for steel for the San Francisquito power plant. The Chicago Bridge & Iron Company has a contract for a tank and tower at Chico, Cal. Plans are out for a seven-story steel frame hotel on Mason street, this city. Bids will be taken December 23 for an eight-story Y. M. C. A. building at Vancouver, B. C. A new Masonic temple is planned at Portland, Ore., and a 12-story building will replace the old Marquam block in that city. The Washington Securities Company has let contracts for the first unit of a large building at Seattle. The largest bridge work in prospect is the Carquinez bridge of the Oakland & Antioch Railroad, for which plans are being drawn.

**Rails.**—There is no large buying and the total tonnage is rather light, though a few orders are coming from street railroads. Track specials figure quite largely in the latter. The timber purchase of the Sierra Sugar Pine Company has been confirmed, and surveys are said to be in progress for a road of 60 to 80 miles. Small orders are expected soon for extensions to logging roads all over the coast, and inquiries are expected at any time from a number of important projects.

**Sheets.**—Galvanized roofing sheets are quiet, the local movement being somewhat lighter than last year, though there is still a good demand in other parts of the State. In other lines the jobbing trade is normal, though local merchants, being well supplied, are now specifying on a rather small scale. Consuming trades, however, are specifying freely, manufacturers of irrigation supplies being among the largest buyers, and few mill agents are able to take all the business offered them.

**Plates.**—Distributive trade is quiet, and merchants are fairly well supplied, though some of the larger consumers find their work delayed by slow deliveries. Tank manufacturers and shipbuilders are getting a fair amount of new business, but nothing of unusual importance.

**Merchant Pipe.**—Merchants' specifications show further curtailment, as stocks on hand or already specified will cover normal requirements for some time. The jobbing movement, however, is highly satisfactory. Deliveries are very slow on some classes of pipe, and fairly prompt in others. A few fair orders have been placed in the oil fields, being taken by mills which could offer the best delivery. A very good volume of waterworks business is coming out. The town of Fullerton, Cal., took bids December 9 for seven miles of steel pipe, 4 to 12 in.

**Cast Iron Pipe.**—Business has taken a sudden turn for the better, and to a very satisfactory volume of small orders are added some large municipal inquiries. Figures are now being taken on a large tonnage at Seattle, Wash., and the city of Portland will probably place a contract shortly for about 6000 tons. The city of Vancouver, B. C., is also coming in the market for a large amount. The city of Anaheim, Cal., will take bids on a small lot this week. A heavy movement all over the coast is expected early in the new year. Quotations, per net ton, San Francisco, are $38.50 for 4-in.; $36.50 for 6 to 10-in.; and $36 for larger sizes.

**Pig Iron.**—The market remains rather quiet, current needs being fairly well covered, though small orders are fairly numerous. Prices are firm, in sympathy with producing markets, though there is considerable variation in prices quoted in different quarters on foreign iron. Importers having some Jarrow for prompt delivery from store quote $26 to $26.50 per gross ton, while No. 2 Southern foundry iron is held at about $24.50.

**Coke.**—Buying continues on a rather limited scale, most foundries in this vicinity having a fair tonnage on hand, though with advancing prices a larger movement is expected. Importers quote spot coke, f. o. b. San Francisco, at $15 to $15.50, per net ton, and Pelton Main or German Syndicate coke, to arrive, at $14 to $14.50 per gross ton.

**Old Material.**—Prices are maintained in all lines. Cast iron scrap is especially firm, with a good demand and light offerings. Some large sales of steel scrap are pending, and a few good orders for second hand pipe are coming out. Dealers quote: Cast-iron scrap,

per net ton, $15.50; steel melting scrap, per gross ton, $12.50; wrought scrap, per net ton, $12.50 to $15; rerolling rails, per net ton, $11.

## Boston

BOSTON, MASS., December 17, 1912.

**Old Material.**—The general dullness in purchases by the mills continues, but the condition is seasonable. The dealers look for a buying movement in January and see prospects of a good business. Prices have not changed in the week. The quotations given below are prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

| | |
|---|---|
| Heavy melting steel | $11.75 to $12.00 |
| Low phosphorus steel | 14.00 to 15.00 |
| Old steel axles | 15.00 to 15.50 |
| Old iron axles | 23.00 to 23.50 |
| Mixed shafting | 14.00 to 14.25 |
| No. 1 wrought and soft steel | 11.75 to 12.00 |
| Skeleton (bundled) | 10.00 to 10.25 |
| Wrought iron pipe | 10.50 to 10.75 |
| Cotton ties (bundled) | 10.00 to 10.25 |
| No. 2 light | 4.50 to 5.00 |
| Wrought turnings | 8.00 to 8.25 |
| Cast borings | 7.75 to 8.00 |
| Machinery, cast | 13.50 to 14.00 |
| Malleable | 11.00 to 11.50 |
| Stove plate | 9.00 to 9.50 |
| Grate bars | 8.00 to 8.25 |
| Cast-iron car wheels | 13.50 to 14.00 |

## Buffalo

BUFFALO, N. Y., December 17, 1912.

**Pig Iron.**—The market displays features of dullness incident to the holiday season, but sales have been by no means a negligible quantity and foot up to between 15,000 and 20,000 tons, all grades, for the week, and the general outlook is exceedingly good. The majority of producers are holding firmly to the maximum of the schedule which we quote below for delivery over first half of 1913, f.o.b. Buffalo:

| | |
|---|---|
| No. 1 foundry | $17.50 to $18.25 |
| No. 2 X foundry | 17.25 to 18.00 |
| No. 2 plain | 17.25 to 17.75 |
| No. 3 foundry | 16.75 to 17.50 |
| Gray forge | 16.50 to 17.25 |
| Malleable | 17.25 to 18.00 |
| Basic | 18.00 to 18.25 |
| Charcoal, regular brands and analysis | 18.75 to 19.25 |
| Charcoal, special brands and analysis | 22.00 |

**Finished Iron and Steel.**—Specifications on contracts terminating January 1 are coming in for full amounts for steel bars and other finished products. According to indications more agencies are now accepting contracts for business for delivery at mills' convenience, which practice will carry deliveries into the last half of next year. The week has developed a number of inquiries from that class of trade which usually each spring puts in a small stock of structural material in quantities ranging from a double carload to 200 tons. These concerns are sending their inquiries to all of the steel producers and are so far having considerable difficulty in placing their orders. None of the large mills is able to take orders for delivery during the first half. Eastern mills, able to make deliveries asked, secure this business at 1.60c. to 1.75c. Some agencies announce that the price on cement coated nails has been advanced 5c. per keg, effective to-day. In fabricated structural material many building projects are developing for spring and summer erection. Green & Wicks, architects, Buffalo, have plans nearly completed for the Buffalo Public General Hospital Commission, for tuberculosis pavilions and the initial unit of a power plant for the new general hospital at the West Farm site which will call for a large tonnage of steel. Bids are also being received for about 200 tons of steel for a large machine shop and erecting building for the J. P. Devine Company, Buffalo, manufacturer of vacuum drying apparatus. The Dominion Theater Company, Hamilton, Ont., is taking bids for 200 tons of steel for a theater and office building. Smith & McCaffery, Syracuse, have received contract for the 200 tons for a factory and warehouse to be erected by the American Can Company at Rome, N. Y.

**Old Material.**—The market is quiet, the demand having lessened on account of the approach of the inventory period. Some business has been transacted with out-of-town users, but the aggregate for the week has been small. Prices have not been quite so strong as for a few weeks past and slight reductions in some commodities are noted. We quote as follows per gross ton f.o.b. Buffalo:

| | |
|---|---|
| Heavy melting steel | $14.50 to $15.25 |
| Low phosphorus steel | 16.75 to 17.25 |
| No. 1 railroad wrought | 15.50 to 16.00 |
| No. 1 railroad and machinery cast scrap | 13.50 to 14.25 |
| Old steel axles | 16.50 to 16.75 |
| Old iron axles | 23.75 to 24.00 |
| Old car wheels | 16.00 to 16.75 |
| Railroad malleable | 13.00 to 13.50 |
| Boiler plate sheared | 14.50 to 15.00 |
| Locomotive grate bars | 11.25 to 11.75 |
| Wrought pipe | 10.00 to 10.50 |
| Tank iron | 10.25 to 10.75 |
| Wrought iron and soft steel turnings | 8.75 to 9.00 |
| Clean cast borings | 8.00 to 8.50 |

## British Iron Production Curtailed

### Railroad Strike Ended but Effects Are Felt—Rail Inquiry from Australia

*(By Cable.)*

MIDDLESBROUGH, ENGLAND, December 18, 1912.

The market is generally firm but quiet. The railroad strike on the northeast coast is ended but production of pig iron is still curtailed and further effects will probably be seen later. Holiday influences are now predominant. The scarcity of semi-finished steel is still unrelieved. Good inquiry for billets continues. South Australia is inquiring for 19,000 tons of rails. Pig iron warrant stocks are 243,100 tons, a reduction of 8000 tons in three weeks. We quote as follows:

Cleveland pig iron warrants (closing Tuesday) 66s. 8½d. against 67s. 7½d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 67s. against 68s. one week ago.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £6, for January-March delivery.

German sheet bars, f.o.b. Antwerp, 112s. 6d.

German 2-in. billets, f.o.b. Antwerp, 107s.

German basic steel bars, f.o.b. Antwerp, £6 4s.

Steel bars, export, f.o.b. Clyde, £8 5s.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 10s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yard, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 15s. 1½d.

### Criticism of American Sellers of Steel, Whose Deliveries Are Far Behind

*(By Mail)*

MIDDLESBROUGH, December 5, 1912.

No signs of approaching reaction are to be detected in the general position of the British iron and steel trades, though it must be confessed that just at the moment the Cleveland warrant market looks uncommonly sloppy. The slackness in sentiment here arises, however, from nothing more serious than the falling off of shipments due to the seasonal closing of many Northern ports. Whatever the Cleveland people think about it, however, there is not the slightest wavering among the ironmasters of other parts of the country whose books are overflowing with orders, and who at Birmingham the other day were refusing to add to their contracts for the present, notwithstanding that buyers were offering advanced rates. Forge iron is exceedingly scarce and dear, and this is forcing up the price of bars, the Scottish makers having this week raised their price for the home trade, though it is quite possible that the move is really only the logical outcome of the big combination of which you have been already advised, getting into the saddle. The buying of hematite has been fast and furious in the past few weeks, and one would think that prospective demands were getting well covered, but so far there is no evidence of this. There are to-day big inquiries for deliveries over the whole of next year, and for Scotch hematite 86s. has been bid in vain for 20,000 tons, while for 3000 tons 87s. was refused. Those people who bought so largely of German hematite are in a fix, for from one cause or another they cannot get their deliveries and local iron is simply not to be had. Hence works have been closing in part.

### A Serious Steel Shortage

In semi-finished steel the position is one of the utmost gravity. It is no longer a question of price, but of obtaining delivery of steel purchased. German makers selling to this country have been enormously handicaped by the paralysis of their railroad service. This is due in part to neglect to look ahead and also to the lateness of the beet root crop, which at a critical time necessitated the dispatch of thousands of cars from the industrial to the agricultural districts. Beet roots, as perishable goods, took precedence of other traffic and the result has been the frequent stoppages of iron and steel works unable to obtain supplies of fuel and other raw materials. The worst news, however, is that sellers in the United States are postponing deliveries to consumers in Wales for months owing to the urgent demands of the American home trade. The largest buyer here has been advised that his contracts for this year, on which he has not yet received his September quota, although fully specified months ago, will be extended until May of next year. Some pretty hard things are being said just now about this action and the criticism loses none of its force from the knowledge that the Germans, however much they may be pressed and though their deliveries may get behind, serve all their customers alike.

## New York

NEW YORK, December 18, 1912.

**Pig Iron.**—The market continues quiet, both as to new inquiries and actual sales, but consumers are calling for shipments fully up to contract terms and the scale of consumption is well maintained. The largest purchase of the week, so far as reported, is a total of 1000 tons taken by a railroad equipment interest operating a number of foundries. Its inquiry was for about 1800 tons. Pending business for delivery in this district amounts to 1500 or 2000 tons for the first half and first quarter, largely in lots of 200 to 500 tons. Pipe works on the Delaware have taken considerable iron in the past week, probably 6000 to 7000 tons, some of it on the basis of $17.50 for Nos. 3 and 4 delivered, a part of the iron, it is reported, coming from Virginia furnaces. While Southern resale iron has been available recently at $13.50, Birmingham, for No. 2, which would represent $17.50 delivered by water on the Delaware, it does not appear that Alabama iron has figured in Eastern district purchases. Buffalo furnaces are kept very busy meeting deliveries and like Eastern Pennsylvania furnaces are pretty well sold for the first half. There is no change in prices, Eastern Pennsylvania furnaces quoting $17.50 to $17.75 at furnace for No. 2 X for delivery in the first half. There is little demand for basic iron, though one inquiry for several hundred tons for prompt shipment is reported from Eastern Pennsylvania. We quote as follows for Northern iron at tidewater: No. 1 foundry, $18.50 to $18.75; No. 2 X, $18.25 to $18.50; No. 2 plain, $17.75 to $18. Southern iron is quoted at $18.75 to $19 for No. 1 foundry and $18.50 to $18.75 for No. 2.

**Structural Material.**—A good feeling pervades New York structural circles, as work continues to come into the market and contracts are closed. Including 6000 tons for the Consolidated Gas Company's building, 130 East Fifteenth street, given to Milliken Brothers, 30,000 tons of fabricated material involved in large projects in local territory have been closed in the last two weeks. The McClintic-Marshall Construction Company is to erect the 3500-ton structures for the Crucible Steel Company at Syracuse and 300 tons for the Scoville Mfg. Company at Waterbury, Conn.; the Hinkle Iron Works is to erect the 700-ton addition to Prince George Hotel, and the Phoenix Bridge Company is understood to have the 6000 tons or thereabouts required for the Boston harbor steamship dock to be completed May 1. Among new projects are the Penn Mutual Building, Philadelphia, Pa., 3000 tons, and a bridge for the West Shore Railroad, 900 tons. We quote plain material at 1.61c. to 1.86c., New York, for mill shipment, according to delivery, and 2.25c. from store.

**Steel Plates.**—The market remains normal for this season and no new general business of size has been closed save 1500 tons for first quarter, bought at 1.65c., Pittsburgh. Car buying is spasmodic, and if there is no concerted programme aiming at the seemingly erratic purchases, the condition is at least accomplishing the desired competition among the car builders. There was another spurt in car buying since the last report, and the total in that time is 13,000 cars, counting in that total 5000 underframes for the Chicago, Milwaukee & St. Paul, which were taken by the Bettendorf Axle Company. This company also closed for 2500 gondolas for the Illinois Central. The other car purchases include 1500 gondolas for the Chicago, Burlington & Quincy, a third to the American Car & Foundry Company and the remainder to the Haskell & Barker Car Company; 500 box cars to the Mount Vernon Car Mfg. Company and 500 stock to the Ralston Steel Car Company for the Norfolk & Western; 1000 composite gondolas for the New York Central to the American Car & Foundry; 1000 cars for the Chicago, Indianapolis & Louisville, to the Haskell & Barker Car Company, and 1000 cars for the Baltimore & Ohio to the Cambria Steel Company. The Harriman Lines are to buy 203 tank cars and the Lackawanna 35 passenger equipment cars. Cars purchased now are in general for delivery in the second quarter. Plates from Eastern Pennsylvania mills are obtainable in six weeks at the recently prevailing prices with premiums for shipment for emergency purposes. Sheared plates are 1.61c. to 1.66c., New York, the former price being for delivery in the third quarter and universal plates are $1 a ton higher.

**Iron and Steel Bars.**—Specifications for both steel and iron bars have shown a decrease but in both lines the situation is regarded as a temporary relief. Bar-iron prices are stronger, one mill now asking 1.80c., New York, two weeks in anticipation of its intention to establish this price on January 1. From other sources it would appear, however, that the recent advance in bolts and nuts is not well held and that shafting is also not softer and little or no effort is being made to sell pipe on the new full-weight schedule, though this does not take effect until January 1. Steel bars remain nominally 1.40c., Pittsburgh, or 1.56c. minimum, New York, mill shipments, and from store 2.05c. Refined iron bars are 1.70c. to 1.75c., New York, and from store, 2.05c.

**Ferroalloys.**—Inquiries are very light for 80 per cent. ferromanganese and the market has a little easier tone. Prices, however, are practically unchanged at $65, Baltimore, for second quarter and last half delivery; up to $70 for early delivery and $71 to $75 for spot. In the last week a sale of 500 tons was made at the full price of $65 for second half. For 50 per cent. ferrosilicon there is also an absence of demand, and prices are unchanged at $75, Pittsburgh, for carloads, $74 for 100 tons and $73 for 600 tons or over.

**Cast Iron Pipe.**—Bids will be opened at Atlantic City, N. J., for 1200 tons December 19; at Boston, Mass., for 7000 tons of 8 to 20 in. December 27; at Detroit, Mich., for 3800 tons of 8 to 14 in. January 14. A great deal of private buying is now in progress, with numerous orders being entered for delivery next year. Carload lots of 6 in. are quoted at $24.50 to $26 per net ton at tidewater, according to the condition of maker's order books.

**Old Material.**—Old car wheels are the most active of any class of material on the list. The price of $17.50, Pittsburgh, has been obtained on shipments from this vicinity. Other grades of cast scrap are in good demand and prices are firm. Heavy melting steel scrap is quiet, with continued difficulty in making deliveries to steel plants as some of them have embargoes while others are requesting shipments to be deferred. The embargo on one of the largest steel plants in eastern Pennsylvania has been lifted, but it is not yet willing to receive much material. Rolling mills are buying but sparingly and prices on some classes of rolling mill stock are slightly lower. Quotations on steel scrap and rolling mill stock are nominal, and anything of this character which must be moved can only be sold at lower prices. Dealers' quotations are as follows, per gross ton, New York and vicinity:

| | |
|---|---|
| Old girder and T rails for melting | $12.00 to $12.50 |
| Heavy melting steel scrap | 12.00 to 12.50 |
| Relaying rails | 22.50 to 23.00 |
| Rerolling rails | 14.00 to 14.50 |
| Iron car axles | 24.00 to 25.00 |
| Old steel car axles | 16.00 to 16.50 |
| No. 1 railroad wrought | 13.75 to 14.25 |
| Wrought iron track scrap | 13.00 to 13.50 |
| No. 1 yard wrought, long | 12.50 to 13.00 |
| No. 1 yard wrought, short | 12.00 to 12.50 |
| Light iron | 5.25 to 5.75 |
| Cast borings | 8.25 to 8.75 |
| Wrought turnings | 8.50 to 9.00 |
| Wrought pipe | 10.75 to 11.25 |
| Old car wheels | 15.50 to 16.00 |
| No. 1 heavy cast, broken up | 12.00 to 12.50 |
| Stove plate | 9.75 to 10.00 |
| Locomotive grate bars | 9.00 to 9.50 |
| Malleable cast | 11.50 to 12.00 |

# Metal Market

NEW YORK, December 18, 1912.

### The Week's Prices

Cents per Pound for Early Delivery.

| | Copper, New York. | | | Lead | | Spelter | |
|---|---|---|---|---|---|---|---|
| Dec. | Lake. | Electro-lytic. | Tin, New York. | New York. | St. Louis. | New York. | St. Louis. |
| 12 | 17.75 | 17.50 | 49.55 | 4.35 | 4.20 | 7.30 | 7.15 |
| 13 | 17.62½ | 17.37½ | 49.60 | 4.32½ | 4.17½ | 7.30 | 7.15 |
| 14 | 17.62½ | 17.37½ | ..... | 4.32½ | 4.17½ | 7.30 | 7.15 |
| 16 | 17.62½ | 17.37½ | 49.65 | 4.32½ | 4.17½ | 7.30 | 7.15 |
| 17 | 17.62½ | 17.37½ | 50.00 | 4.32½ | 4.17½ | 7.30 | 7.15 |
| 18 | 17.62½ | 17.37½ | 49.87½ | 4.32½ | 4.17½ | 7.30 | 7.15 |

Copper is quiet and prices are lower. Spot tin, of which there has been fair buying, is becoming scarcer and prices are higher. Lead is in little demand and can be had at lower figures. Spelter is dull in a sagging market. Antimony is very quiet and quotations are lower.

### New York

**Copper.**—There has been very little trading in copper in the last week and the market is softer. The lack of demand is by many ascribed to the holiday season, as is the case with nearly all the metals and some finished products. Lake, which has maintained its price more firmly than electrolytic, has at last felt the inactivity of purchasers and can be had at least ⅛c. under the 17.75c. price, which so long prevailed. Electrolytic is selling down to 17.37½c., cash, New York, and even this price might be shaded by holders of resale lots. The price mentioned, 17.37½c., cash, or 17.50c., cash, 30 days delivered, is that of the producers and large selling agencies. In London there has been considerable activity in standard or speculative copper in the last few days, but it has had little effect on the market here. The price in London this morning is £74 12s. 6d. for spot and £75 13s. 9d. for futures. The exports this month show an improvement over the corresponding time of November, totaling 15,534 tons, and it is probable that the month's aggregate will reach 25,000 tons.

**Pig Tin.**—In the last week there has been a more or less steady buying of tin for immediate delivery. The quantities involved cannot be called great, yet they were very satisfactory under the circumstances. Yesterday tin again touched 50c. and to-day it is quoted at 49.87½c., the higher prices resulting from a feeling that spot tin is daily becoming more scarce and that a slight pinch may be felt before the month is over. There also has been some inquiry for futures but only a little business in these positions resulted. Unquestionably a much larger business than has been current would be done were it not for the deterrent effect of high prices. The price in London this morning for both spot and futures is £227. The arrivals this month are 1553 tons and there is afloat 2546 tons.

**Tin Plates.**—There has been no change of importance in the local tin plate situation, although the persistent high price of tin is being regarded with interest as having ultimately an effect on tin plate.

**Lead.**—This metal is very quiet but while the market is easy there is no longer the extreme pressure to sell which existed of recent date. Holders of lead are not averse, however, to selling at prices which shade those of the American Smelting & Refining Company, but there are few takers. The large interest continues to quote 4.35c., New York, and 4.20c., St. Louis, but other sellers quote 4.32½c., New York, and 4.17½c., St. Louis.

**Spelter.**—The market is characterized by weakness because of the almost complete absence of demand. The present prices of spelter, 7.15c. to 7.20c., St. Louis, and 7.30c. to 7.35c., New York, are regarded as very good considering the light demand. In the effort to induce business some excellent brass mill spelter has been sold at a price approximating that of prime Western, and this despite the fact that the season is approaching which ordinarily restricts production. The producer concerned preferred to sell at the low price rather than carry a few carloads over into next year.

**Antimony.**—Business is very quiet. Quotations are firm at 10c. to 10.25c. for Cookson's; 9.37½c. to 9.50c. for Hallett's, and 9c. to 9.25c. for Hungarian and Chinese grades.

**Old Metals.**—The market is very quiet and in a waiting attitude. Dealers' selling prices are nominally as follows:

| | Cents per lb. |
|---|---|
| Copper, heavy and crucible | 16.75 to 17.00 |
| Copper, heavy and wire | 15.75 to 16.00 |
| Copper, light and bottoms | 14.50 to 14.75 |
| Brass, heavy | 10.25 to 10.50 |
| Brass, light | 8.25 to 8.50 |
| Heavy machine composition | 13.75 to 14.00 |
| Clean brass turnings | 9.50 to 9.75 |
| Composition turnings | 12.00 to 12.50 |
| Lead, heavy | 4.25 |
| Lead, tea | 4.00 |
| Zinc, scrap | 6.00 |

### Chicago

DECEMBER 17.—Tin quotations are unchanged. Lead prices, although held at the same level by the principal producer, are being shaded from 5 to 10 points by outside interests. Spelter is not so firmly held. We quote as follows: Casting copper, 17.62½c.; Lake, 17.75c. to 18c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 50.75c.; small lots, 52.50c.; lead, desilverized, 4.35c. for 50-ton lots; corroding, 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.30c. to 7.40c.; Cookson's antimony, 11.25c., and other grades, 10.50c. in small lots; sheet zinc is $9, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 15.50c.; copper bottoms, 14c.; copper clips, 15c.; red brass, 12.75c.; yellow brass, 10c.; lead pipe, 4c.; zinc, 5.50c.; pewter, No. 1, 33c.; tinfoil, 39c.; block tin pipe, 45c.

### St. Louis

DECEMBER 16.—The market has been rather quiet, with some recession in prices. Lead is to-day quotable at 4.15c. to 4.20c.; spelter, 7.15c. to 7.20c.; tin, 49.95c. to 50.22½c.; Lake copper, 17.97½c. to 18.22½c.; electrolytic copper, 17.87½c. to 18.12½c.; antimony, Cookson's, 10.85c. In the Joplin ore market there has been some weakening of prices. The best price for zinc blende was $57 per ton for 60 per cent., compared with $58 the week before. The basis offerings ranged down to $52, second grades being about $2 to $3 per ton lower than the preceding week. The choicest lots on the market, running high in metallic zinc, brought as high as $60. The demand was lighter, owing to the fact that the smelters are beginning their annual inventories. Calamine was in good demand at $29 to $33, assay basis of 40 per cent., while the choice grades brought as high as $38. Lead ore, which has been in weak demand at low figures for the past week or two, continued in the same state, the best offering being $53 for grades carrying 80 per cent. On miscellaneous scrap metals we quote as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; zinc, 4c.; lead, 3.50c.; pewter, 25c.; tinfoil, 32c.; tea lead, 3c.

---

# Iron and Industrial Stocks

NEW YORK, December 18, 1912.

Depressing influences held sway in the stock market for the greater part of last week. The course of prices was persistently downward until Monday when the Supreme Court decision in the case of the Reading Railroad Company showing only a partial victory of the Government caused a revulsion of sentiment with some recovery in prices. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

| | | | |
|---|---|---|---|
| Am. Can, com. | 26¾- 29½ | Nat. En. & St., com. | 16½- 17 |
| Am. Can, pref. | 112 -114⅜ | Pressed Steel, com. | 34 - 35 |
| Am. Car & Fdy., com. | 53⅝- 55¼ | Pressed Steel, pref. | 99¼-100 |
| Am. Car & Fdy., pref. | 115¼-115¾ | Railway Spring, com. | 33¾- 34¼ |
| Am. Loco., com. | 40 - 42½ | Railway Spring, pref. | 98¼ - 99 |
| Am. Loco., pref. | 106 -106¾ | Republic, com. | 23½- 26 |
| Am. Steel Fdries. | 34 - 35⅛ | Republic, pref. | 84 - 87 |
| Bald. Loco., com. | 50 - 52⅛ | Rumely Co., com. | 89¾- 92½ |
| Bald. Loco., pref. | 103⅛-103¼ | Rumely Co., pref. | 100 -100¾ |
| Beth. Steel, com. | 34 - 36⅜ | Pipe, com. | 17 - 17⅞ |
| Beth. Steel, pref. | 63 - 67 | Pipe, pref. | 57¼- 59 |
| Case (J.I.) Co., pref. | 100¼-101 | U. S. Steel, com. | 63¾- 66⅞ |
| Colorado Fuel | 30⅜- 34 | U. S. Steel, pref. | 107¼-109⅜ |
| Deere & Co., pref. | 99¾-100½ | Va. I. C. & Coke | 55 - 57 |
| Emer-Brant, com. | 65 - 67 | Westinghouse Elec. | 74¾- 77½ |
| Emer-Brant, pref. | 98 -100¼ | Chic. Pneu. Tool | 49 - 51½ |
| General Electric | 179 -182⅜ | Cambria Steel | 47¾- 49¼ |
| Gr. N. Ore Cert. | 40 - 41½ | Lake Sup. Corp. | 30 - 30¾ |
| Int. Harv., com. | 105½-111½ | Pa. Steel, pref. | 94 |
| Int. Harv., pref. | 113¾-114½ | Warwick | 10¼ |
| Int. Pump, com. | 19 - 19¾ | Crucible Steel, com. | 15 - 16¼ |
| Int. Pump, pref. | 72⅝- 74¾ | Crucible Steel, pref. | 92½- 95 |
| Lackawanna Steel | 46 - 47 | | |

### Dividends Declared

The J. I. Case Threshing Machine Company, regular quarterly, 1¾ per cent. on the preferred stock, payable January 1.

The Otis Elevator Company, regular quarterly, 1 per cent. on the common and 1½ per cent. on the preferred stock, payable January 15.

The Canadian Westinghouse Company, regular quarterly 1¾ per cent., also bonus of 2 per cent., both payable January 10.

The Westinghouse Air Brake Company, regular quarterly, 2 per cent. and an extra of 2 per cent., the same as three months ago, payable January 15.

The Standard Coupler Company, regular semi-annual, 4 per cent. on the preferred and 2 per cent. on the common stock, payable December 23.

The American Iron & Steel Mfg. Company, regular quarterly, 1¾ per cent. on the common and preferred stocks, payable January 1.

The American Brake Shoe & Foundry Company, regular quarterly, 1¾ per cent. on both the common and preferred stocks, payable December 31.

The Nova Scotia Steel & Coal Company, regular quarterly, 1½ per cent. on the common stock and 2 per cent. on the preferred stock, payable January 15.

The M. Rumely Company, regular quarterly, 1¾ per cent. on the preferred stock, payable January 2.

The Yale & Towne Mfg. Company, regular quarterly, 1½ per cent. and a special of 1 per cent., payable January 2.

The Pettibone-Milliken Company, regular quarterly, 1¾ per cent. on the first and second preferred stock, payable January 2.

The Union Switch & Signal Company, regular quarterly dividend, 3 per cent. on the common and preferred stocks and a stock dividend of 10 per cent. out of the common stock, all payable January 10.

## Personal

Roy D. Hunter has resigned as general sales manager of the Sullivan Machinery Compapny. Howard T. Walsh, who has been the European agent of the company, with headquarters in London, is appointed general sales manager, with headquarters in Chicago. Austin Y. Hoy, representative of the company in Spokane, Wash., succeeds Mr. Walsh in London. Louis R. Chadwick of the St. Louis office succeeds Mr. Hoy as local manager in Spokane.

R. T. Hodgkins, for several years manager of the chain block department of the Yale & Towne Mfg. Company, 9 Murray street, New York, has resigned to accept a position with another company. Charles W. Beaver, who for many years has been connected with that department, first as salesman and later as assistant manager of the department, and who, for the past two years, has acted as the company's special representative in Europe, has been appointed to the position made vacant by Mr. Hodgkins's resignation, and will assume the duties of his new office about February 1.

Miss J. Arminson MacIntyre, for over 10 years manager of the publicity department of the C. W. Hunt Company, West New Brighton, N. Y., has resigned that position, to take effect early in January. While no definite plans have been made for the future, it is understood that she will travel for a time. Communications after January 1 should be addressed care of the National Arts Club, New York City.

S. B. Williamson, since 1908 division engineer of the Pacific division of Panama Canal construction, has resigned his position to enter the service of J. G. White & Co., Ltd., international engineers and contractors of London and New York, in the capacity of principal assistant engineer, directing construction in all parts of the world except the United States and its possessions.

W. H. Lewis, general superintendent of the Aliquippa works of the Jones & Laughlin Steel Company, will retire January 1 and will be succeeded by F. B. Hufnagel, at present general superintendent of the company's South Side works in Pittsburgh. Mr. Lewis will leave for California about January 15 to take a much needed rest and recuperate his health. On his return to Pittsburgh, about April 15, he will connect himself with a large open hearth steel concern in the capacity of general manager.

Frank H. Johnson, supervisor of labor for the Illinois Steel Company at its South works, has resigned to become manager of sales at Pittsburgh for the West Leechburg Steel Company. He was tendered a farewell dinner at the South Shore Country Club, Chicago, at which William A. Field, general superintendent of the South works, presided.

Fred Coe Taylor, chief engineer of the Conley Frog & Switch Company, Memphis, Tenn., has resigned to become manager of the insulation department of the St. Louis branch of the H. W. Johns-Manville Company. J. W. Buzick, who was assistant engineer, succeeds Mr. Taylor.

Woodmansee, Davidson & Sessions, consulting engineers, First National Bank Building, Chicago, have associated with them, in the capacity of combustion engineer, C. M. Garland, late of R. D. Wood & Co., and formerly of the faculty of the University of Illinois, who has specialized in the gasification of fuels and the application of producer and water gas to industrial and power requirements.

A. J. Horner, formerly connected with the motive power department of the Pennsylvania Railroad Company, has been appointed supervisor of motive power of the Homestead steel works of the Carnegie Steel Company, at Homestead, Pa.

Charles L. Hastings, formerly with the American Vanadium Company, has started a manufacturers' agency at 2306A Murray avenue, Pittsburgh, Pa., and is representing the Alloy Steel Casting Company, Wheeling, W. Va., manufacturer of carbon and alloy steel castings and composition steel ingots.

The Union Drawn Steel Company, Beaver Falls, Pa., has appointed K. W. Moynes district manager of sales for the New England territory with headquarters at 95 Milk street, Boston. Mr. Moynes was until recently office manager of the New York office.

H. C. Macklin has been appointed purchasing agent of the Chesterfield & Lancaster Railroad, Norfolk, Va., effective December 16.

R. M. Hawkins, Jr., who has been connected several years with the Standard Welding Company, Cleveland, Ohio, has resigned his position as assistant purchasing agent.

A. D. Wilt, Jr., vice-president and general manager Schweppe & Wilt Mfg. Company, Detroit, Mich., has been elected president of the Wilt Twist Drill Company of Canada, which has been formed to manufacture twist drills at Walkerville, Ontario.

John Huchel, foreman of the plant of the Standard Steel Car Company, New Castle, Pa., has resigned to accept a similar position with the Barney & Smith Mfg. Company, Dayton, Ohio.

John J. Swan, formerly associated with the Chicago Pneumatic Tool Company, New York, as manager of the New York office and later as mechanical engineer in the compressor department, has become associated with the Oil Power Engineering Corporation, New York.

George M. Wright, president Wright Wire Company, Worcester, Mass., was elected mayor of his city by a large majority at the municipal election last week.

## Obituary

### Cyrus Elder

Cyrus Elder, at one time prominent in politico-economical circles and widely known by American manufacturers, died at Philadelphia, Pa., December 14, aged 79 years. He was born in Somerset, Pa., in 1833, admitted to the bar in 1856, served in the Union army in 1861-2, and engaged in the practice of law at Johnstown, Pa., in 1863. He became solicitor and general agent of the Cambria Iron Company, now Cambria Steel Company, and continued as such until 1901 when he retired from business. During this period, as a man of high ideals, he was interested in political economy and for several years was secretary of the Industrial League, whose headquarters were in Philadelphia, and acted as editor of its publications. He was a forceful advocate of the protective policy and wrote numerous pamphlets as well as a few more ambitious arguments in its support. Having the gift of versification, he wrote many poems, some of which were collected and published in book form. He took a deep interest in local affairs and organized the Johnstown Savings Bank, Cambria Mutual Benefit Association, Cambria Public Library, and Union Benevolent Association. He lost his wife and daughter in the memorable Johnstown flood of 1889. His wife was a sister of James M. Swank, the eminent statistician. For

the past few years he resided in Philadelphia. He leaves two sons and a daughter. His eldest son, George R. Elder, Easton, Pa., is vice-president and general manager of the Ingersoll-Rand Company.

---

ELIAS CRANDALL, whose decease was mentioned in *The Iron Age* of December 12, was born in New York May 25, 1829, and removed to Ohio in his early manhood, settling first at Marietta. In 1851 he secured employment with the Empire and Junior (charcoal) furnaces in Scioto County, Ohio. Some years afterward he became superintendent of those furnaces, continuing in that capacity until he removed to Jackson, Ohio, in 1873. At that time the Globe Iron Company was organized and purchased the Globe and Fulton furnaces, of which Mr. Crandall became superintendent. He continued in the active management of the business until the time of his death. His long experience had covered the manufacture of pig iron with charcoal, with raw bituminous coal and with coke. He served in the Ohio State Senate for two terms. He leaves a widow and two daughters.

GEORGE BURNHAM, SR., Philadelphia, Pa., formerly a partner in Burnham, Williams & Co., Baldwin Locomotive Works, and an associate of Matthias W. Baldwin, the founder of the works, died December 10, aged 95 years. Mr. Burnham became identified with the Baldwin Works in the early days of locomotive building, and in 1867, following the death of Mr. Baldwin, became a member of the firm, then styled M. Baird & Co. On Mr. Baird's retirement, in 1873, Mr. Burnham became senior member of the firm then known as Burnham, Parry, Williams & Co., and later as Burnham, Williams & Co., which continued until the incorporation of the business in 1909 as the Baldwin Locomotive Works. Mr. Burnham's connection with the industry covered 73 years. He was born at Springfield, Mass., and when about 15 years of age went to Philadelphia, securing employment in a grocery store, later becoming bookkeeper for Mr. Baldwin. He leaves two sons and a daughter.

HUMPHRIES MILLER, Pittsburgh, Pa., died December 11, aged 52 years. His education was received in Allegheny City public schools and in the Chester Military Academy, from which he was graduated in 1878. He then entered the firm of A. G. Hatry, iron broker, Pittsburgh. In 1880 he became connected with the Keystone Rolling Mill Company, where he learned the practical side of the iron trade. He rose to the position of paymaster, which he held until 1882, when he entered the Miller Forge Company, Braddock, Pa., owned by his father. In 1897 he engaged in the brokerage business. He leaves a widow, one son and three daughters.

GEORGE B. CARPENTER, Chicago, president and founder of George B. Carpenter & Co., ship chandlers and jobbers, died of paralysis at his home December 11, aged 79 years. He located in Chicago in 1857.

---

## Cleveland Metal Trades Meeting and Banquet

About 125 were present at the annual fall meeting and banquet of the Cleveland Branch National Metal Trades Association, held in the ball room of the Hotel Statler, Tuesday evening, December 17. Henry D. Sharpe, president Brown & Sharpe Mfg. Company, Providence, R. I., and also president National Metal Trades Association, was the guest of honor. Others present included members of the branch, other Cleveland manufacturers and officers of the Cleveland Chamber of Commerce. C. B. Willson, president of the branch, acted as toastmaster. Among the speakers were President Henry D. Sharpe; W. D Sayle, president Cleveland Punch & Shear Works Company; H. H. Johnson and F. A. Henry, president and vice-president Chamber of Commerce, and F. G. Hogan, director of the Cleveland schools.

---

The Reading-Bayonne Steel Casting Company, Reading, Pa., has arranged to purchase electric power for the operation of its plant at Reading from a local power company and has installed a number of motors. It is also investigating electric melting furnaces with a view of introducing them.

## Pittsburgh and Vicinity Business Notes

The new headquarters of the Pittsburgh Publicity Association, on the tenth floor of the Keenan Building, were formally opened on the evening of December 10. An address was made by Elbert Hubbard on "The Romance of Business."

A special meeting of stockholders of the Neville Iron Company, Pittsburgh, will be held February 10, 1913, to vote on a proposed increase in the capital stock from $25,000 to $50,000.

A special meeting of stockholders of the Pittsburgh Cold Rolled Steel Company, Pittsburgh, will be held February 11, 1913, to vote on a proposed increase in the capital stock from $50,000 to $150,000.

The Valley Machine Company, Parkersburg, W. Va., has taken over the Stiles Mfg. Company, of the same city, and will continue the business under the name of the Valley Machine Company. Woodworking machinery, special machinery and machine work, gray iron, brass and aluminum castings will continue to be manufactured. R. G. Stiles has been elected treasurer and superintendent. Other officers and directors are: James Turpin, president and general manager; B. B. Putman, vice-president; John Marshall, secretary, and Fergus C. O'Connor, treasurer.

The Pressed Radiator Company has been organized at Pittsburgh with a capital stock of $1,250,000 and takes over the entire business of the Pressed Radiator Company of America, with works at West Pittsburgh, Pa. The officers of the new company are: J. K. Frye, president; F. C. Perkins, vice-president, and A. M. Pearson, secretary and treasurer. The directors are J. K. Frye, F. C. Perkins, John W. Garland, W. N. Murray and D. N. Seely. The works are running to full capacity, with orders booked that will require some months to fill.

The Pressed Steel Car Company, McKees Rocks, Pittsburgh, is in the market for a spacing table, with multiple punch for punching four angles simultaneously.

The Factory Products Company, 203 Oliver Building, Pittsburgh, has recently taken contracts for equipment as follows: Max Solomon, for the Carnegie, Pa., metal yards, a 20-ton, eight-wheel locomotive crane with 50-ft. boom, equipped with 43-in. lifting magnet and generating set; Pittsburgh Steel Company, Monessen, Pa., 20-ton locomotive crane; Pittsburgh Screw & Bolt Company, Pittsburgh, five-ton, 60-ft. span Toledo crane; Phoenix Iron Works, Meadeville, Pa., 10-ton, 50-ft. span Euclid crane; Republic Chemical Company, Neville Island, Pittsburgh, three 7½-ton, 50-ft. span Euclid cranes and seven jib cranes; James R. Craighill, contractor, Pittsburgh, a ⅝-yd. Browning steam shovel.

On Sunday morning, December 15, the plant of the Ohio Valley Enamel Company at Shadyside, Ohio, about seven miles from Wheeling, was destroyed by fire, the loss being estimated at $100,000 to $150,000.

The new power plant in the Fort Pitt Hotel, Pittsburgh, has been placed in commission and includes three Bruce-Macbeth gas engines of 150 hp. each, direct connected to 100-kw. generators. The installation is unique, due to the fact that the entire apparatus is inclosed in a space of 20 x 24 ft.

The Dravo-Doyle Company, Lewis Building, Pittsburgh, has taken contracts for power plant equipment as follows: Poland Coal Company, Pittsburgh, two 18 x 18-in. Ball engines, to be connected to 150-kw. generators; Meyersdale Coal Company, Meyersdale, Pa., a 200-kw. steam-driven generator set; Crucible Coal Company, Pittsburgh, a 250-hp. engine; Pittsburgh & Lake Erie Railroad Company, two 12 x 16-in. Ball engines to drive 75-kw. generators for installation at Dickerson Run.

The Pittsburgh office of the Ridgway Dynamo & Engine Company, Ridgway, Pa., has recently sold to the Jamison Coal & Coke Company, for installation at Greensburg, Pa., three 250-kw. direct current engine and generator sets and one 150-kw. unit; Consolidated Connellsville Coke Company, Uniontown, Pa., one 250-kw. and one 200-kw. engine and generator sets; W. H. Piper Company, Lilly, Pa., a 100-kw. unit; H. K. Wick Company, Buffalo, for installation at Clarion, Pa., a 125-kw. unit.

The United Iron & Steel Company, Pittsburgh, operating Leetonia furnace at Leetonia, Ohio, and Fannie fur-

nace, at West Middlesex, Pa., has retired $150,000 of its bond issue, payment having been made through the Colonial Trust Company, Pittsburgh, trustee.

The Ellwood City Forge Company, Ellwood City, Pa., is doubling the size of its plant. Among the items of new installation are a 600-lb. Chambersburg steam hammer, a 7½-ton Johnston & Jennings electric jib crane, a 48-in. New Haven double carriage crankshaft lathe, a new heating furnace and a 100-hp. Union Iron Works boiler.

Hubbard & Co., Pittsburgh, manufacturers of shovels, spades, scoops and railroad track tools, have appointed the D. S. Hunter Company, Minneapolis, Minn., as their sales representative in that territory.

About January 1 the offices of the Standard Chain Company will be moved from the Bailey-Farrel Building, Third avenue and Ross street, to the thirteenth floor of the First National Bank Building, Pittsburgh, where it will occupy nearly the entire floor.

The Pittsburgh Crucible Steel Company has received bids on 23 electric cranes of different types to be installed in its open-hearth steel plant now under construction at Midland, Pa. The cranes will vary from five to 30 tons in capacity. This is one of the largest inquiries for cranes that has come out in the Pittsburgh district for some time. It is probable that the contract will not be placed until early next year.

The Wheeling Sheet & Tin Plate Company, Wheeling, W. Va., has placed a contract with the Cleveland Crane & Engineering Company, Wickcliffe, Ohio, for one 5-ton and five 15-ton electric cranes for its new tin plate plant. The Cleveland Crane & Engineering Company has also received a contract from the American Sheet & Tin Plate Company for two 20-ton electric cranes for its sheet mills at Vandergrift, Pa.

R. E. Graves, 1402 Park Building, Pittsburgh, has been appointed representative in that city for the James Clark, Jr., Electric Company, Louisville, Ky., manufacturer of electric drills, reamers and other electrically-driven machinery.

On January 1 the Pittsburgh Screw & Bolt Company will take possession of the works on the North Side, Pittsburgh, now occupied by the Riter-Conley Mfg. Company, which is removing its equipment as fast as possible to its new plant at Leetsdale, Pa. The Pittsburgh Screw & Bolt Company will lay a concrete floor 6 in. in thickness and covering about 300,000 sq. ft. of floor space as soon as it secures possession of the Riter-Conley property.

The Canadian Pacific Railway Company, for three new boiler plants on its lines extending west from Winnipeg, will use oil as fuel. It has placed an order for the fuel oil equipment with Tate-Jones & Co., Inc., Pittsburgh, which will include three pumping, heating and regulating systems and several of the B4 automatically controlled Tate-Jones fuel oil burners.

---

A Pittsburgh jury last week returned a verdict for $20,375.14 for the loss of a leg, in favor of James A. Clark, Jr., against the Best Mfg. Company, Oakmont, Pa. The plaintiff was injured at Sault Ste. Marie, Ontario, Canada, in 1908, while assisting some pipe fitters at the direction of the foreman who had employed him. The case was bitterly contested, and many interesting points of law were argued, arising out of the fact that the accident occurred in Canada. The defense called prominent barristers of Canada to testify as to the laws of England regarding the liability of employers.

---

The Allegheny Steel Company, Oliver Building, Pittsburgh, Pa., states that at 4.30 a. m. Sunday, December 15, fire was discovered in the loft of its office building located at the works at Brackenridge, Pa., and due to strong winds that prevailed practically the entire building was consumed, together with valuable papers, records, etc. The company asks that if any of its friends or customers fail to receive replies to recent letters of theirs they should send at once copies of such correspondence and immediate attention will be given thereto.

---

The Gem Mfg. Company, Chelsea Station, Boston, Mass., has changed its name to Gem Stamped Steel Company.

## Baltimore Business and Industrial Notes

The Boston Iron & Metal Company, formerly located on Holliday street above Saratoga street, has removed to its new scrap yard at Pratt and Fremont streets.

The Rittler Box Company, 613 Caroline street, manufacturer of wooden boxes, is taking bids for the erection of a three-story addition, which will be used exclusively for warehouse purposes. No elevators or machinery equipment will be required.

Under sanitary contract No. 106, the Sewerage Commission of Baltimore City will receive bids until December 18, for a large quantity of material and work, including approximately 14,800 ft. of 5-in. extra heavy cast iron soil pipe.

The Baltimore Tube Company states that it will be several months before the installation of machinery in its new tube mill is completed. Orders have been placed for the equipment for the new brass foundry, which will be installed in the near future. Rapid developments are being made in the company's special products, several of which will not be placed on the market for some months. New flexible steel tubing manufactured by this company is now being tested out.

The Wallace Stebbins & Son Company has installed two 125-hp. Fitzgibbon boilers in the power plant of Joel Gutman. New business is reported quiet, although a good volume of unfinished business is on the company's books.

Crook, Kries & Co. are extremely busy. Among other work on hand is an order to reconstruct the power plant of the Sherwood Distillery, Cockeysville, Md., recently damaged by fire. They also have contracts to install the heating equipment in the local warehouse of the Carnegie Steel Company and an addition to the heating plant of the Maryland School for Feeble Minded at Owings Mills, Md.

The Detrick & Harvey Machine Company is receiving a very fair volume of new business for its various lines of tools, both from domestic and foreign customers. Its shops are well occupied with work in hand.

J. Albert Hughes, receiver for the Thomas C. Basshor Company, manufacturer of mechanical appliances, boilers, etc., recently declared a voluntary bankrupt, is continuing the business. The company has its office and warehouse at 28 Light street, and manufacturing plant at Bayard street and the Baltimore & Ohio Railroad. It has not been decided whether the business will be reorganized or discontinued.

The Aumen Machinery Company reports a quiet month. The demand for machine tools has been confined closely to single tools. While current inquiries are light, a number of good sized equipment projects are pending.

John D. Adt is operating his plant at top capacity. New business has been active. Orders have been booked for two 1½-ton capacity elevators and for tobacco dryers, coolers and stem rollers. One dryer has been shipped to the Italian Government, while an order for another has been taken for export to France. A very fair business in shop supplies is reported. This concern is now occupying a portion of its recently acquired property, materially increasing its facilities.

---

Plans have been prepared for a bridge to cross the Fox River at West Algoma street, Oshkosh, Wis., and bids will be advertised for in the near future. The total length of the bridge is 600 ft., including a Scherzer rolling lift bridge of 118 ft. center to center of end bearings. It will have one 28-ft. roadway and two 6-ft. sidewalks. It will consist of plate girder construction throughout and will require 700 tons of steel and machinery. The Scherzer Rolling Lift Bridge Company, Monadnock Block, Chicago, is the engineer on the entire work for the city.

---

The gray iron and brass foundries of the Bateman Mfg. Company, Grenloch, N. J., were destroyed by fire December 13, together with a new core making department 20 x 75 ft., which had just been completed. Arrangements for rebuilding the burned structures are being made. The new foundries will be built of brick and steel and will be materially larger, with strictly modern equipment. It is expected that temporary arrangements will enable the gray iron foundry to be operated in part in two weeks.

## New Tools and Appliances

*This is essentially a news department for which information is invited*

**Electric Switch Locking Device.**—To prevent unintentional opening of a disconnecting switch, the General Electric Company, Schenectady, N. Y., has developed a locking device for electric switches. This device is a unit in itself and can be easily applied by merely clamping it to a support placed between the clip block and the insulator cap. The device is intended to be operated with a switch hook and consists essentially of two brass bell cranks hinged together at the ends of two shorter arms and held closed by compression springs. The projections or jaws in the outer ends of the two longer arms close in front of the blade, thus preventing the latter from coming out of the clip. Each bell crank has a dog which moves in a slot in the bell crank elbow, the dog being hinged at this point. Two compression springs keep the bell cranks closed and the dogs pressed against the back of the switch blade. When the switch is to be opened the outer ends of the bell crank are pressed back away from the blade and the withdrawing of the switch blade from between the dogs causes the jaws to snap shut as soon as the blade is completely withdrawn. When the switch blade is pressed back, the jaws close automatically and the switch is thus locked in position.

**Calculating Chart.**—A calculating chart which is claimed to give more accurate results than the slide rule has been brought out by George M. Purver, 146 East Eighth street, Brooklyn, N. Y. This device gives accurately and instantly the product of all numbers of two figures only and it is possible with a little training to secure the product of a number of two figures and one of four. It is also possible to multiply numbers having more than four digits by any other such number by writing down the results of the multiplication of any two figures by any other two, thus shortening considerably the ordinary work of multiplication.

**Large Roller Bearings.**—Recently the Standard Roller Bearing Company, Philadelphia, Pa., made some bearings having a roller cage 62¼ in. in diameter. This cage was cast from bronze and has 40 radial cored slots in it which were bored and reamed on a boring mill, an index plate with properly spaced holes in the rim being used under the cage to be bored while the locating was done by a pin and bracket. The holes or slots bored in these cages are 2¼ in. in diameter and contain 260 rollers arranged alternately in groups of six and seven so as to break the bearing lines. The bearing and leveling washers are finished on a large boring mill. The diameter of the latter group of washers is 85 in. and when finishing the concave center the proper curvature of the cut was secured by a cam slot having a roller on the upper end of the tool slide fitting in it.

**Plate Type Friction Clutch.**—A plate type of friction clutch has been recently added to the line made by the Edgemont Machine Tool Company, Dayton, Ohio. The essential parts of the clutch are three disks inclosed in an outer casing having a hub on which the pulley or pulleys are held. The outer casing is provided with an internal rib slotted to fit two keys, one on the floating disk, which is free to float but cannot rotate independently of the outer casing. The lever plate has lugs and is also furnished with a hub which is free to slide laterally when operated by studs and levers. This hub, together with one on the opposite side of the clutch, forms the outer friction members, and when brought into contact with the surfaces of the floating disk rotates the outer casing and the pulleys. The engagement of the clutch is controlled by a shifter rod in the usual way and when it is desired to disengage the clutch coiled springs between the inner surfaces of the two outer plates automatically separate them.

---

The Crucible Steel Company of America, Oliver Building, Pittsburgh, which is a large maker of railroad springs, is making plans for the erection at Midland, Pa., of a plant for the manufacture of locomotive tires. All machinery in this proposed plant will be worked electrically, all the equipment being of the most modern type. Construction will be pushed, and it is expected to have it ready for operation in the latter part of next summer.

## The American Iron and Steel Association's Statistical Work

It is stated in connection with the plans for the taking over of the American Iron and Steel Association on January 1 by the American Iron and Steel Institute that the statistical department of the former will be continued at Philadelphia for the present. It is also expected that the staff which has assisted Mr. Swank in this work will be retained. Reference has already been made in these columns to the resignation of Mr. Swank after 40 years' service and to his desire to have his resignation become effective at the close of this year. While the statistical work of the American Iron and Steel Institute will be carried on at Philadelphia, the executive offices will be in New York in charge of Secretary James T. McCleary.

## Customs Decisions

### Fluorspar

The Board of United States General Appraisers has overruled a protest filed by E. J. Lavino regarding the classification under the tariff act of merchandise returned by the appraiser as fluorspar. Duty was imposed at the rate of $3 per ton under paragraph 90. The importer claimed that the commodity is not the fluorspar known in trade and commerce, and that it is merely a crude substance taken from the dumps at lead mines located in England. The testimony showed that the material is for use in steel works. Free entry was claimed under paragraph 626, as a crude mineral substance not advanced by manufacture. The claim is held by Judge McClelland to be without merit.

### Steel Ties

A protest by Fritze, Lundt & Co., San Juan, Porto Rico, relating to steel railroad ties or sleepers, was overruled. Duty was levied at 45 per cent. ad valorem under paragraph 199 of the tariff act as manufactures of metal not specially provided for. The merchandise was claimed to be dutiable at 7/40 of 1 cent per pound under paragraph 126, as either railroad bars or as T rails. The board holds that the articles in the condition imported are neither railroad bars nor T rails within the meaning of the law. They are something more, being permanently riveted articles made only in part of T rails.

### Beet Shredder Parts

The board denied a contention raised by A. G. Sherrand & Co., dealing with the classification of machine parts used in beet shredding machines. They were described by the appraiser as highly tempered steel file wheels and beet knives or shredders. Duty was assessed at 45 per cent. as manufactures of metal not specially provided for. The importers claimed the articles dutiable at 30 per cent. under the provision for "machine tools." The collector is affirmed.

### Sheet Stampings

The board has decided that steel articles shaped or fashioned from sheet metal with the use of dies by the process of stamping are dutiable under the appropriate rate under paragraph 135 as "pressed, sheared, or stamped shapes of steel." The collector's assessment under paragraph 193 of the act of 1897 as "manufactures of metal not specially provided for" is reversed. The importers include A. & H. Veith and others.

### Paint Ore

The board has made a decision regarding an importation of iron by Wilfred Shade & Co., which was sustained. The merchandise was returned by the surveyor as dutiable at 30 per cent. under paragraph 56 as a crude color. The protestants claimed that the article should have been returned at the rate of 15 per ton under paragraph 117 of the law as iron ore.

### Brass Stampings

It was decided that brass stampings in strips imported by Veit, Son & Co. must stand duty at the rate of 45 per cent. ad valorem under the provision in the law for manufactures of metal. The merchandise was claimed dutiable at lower rates under paragraphs 521, 544 or 545. The collector is affirmed.

# Notes On Drop-Forging Practice

### The Makers' and the Users' Problems —The Process and the Product

Drop-forgings were discussed in a paper read by Frank W. Trabold, of J. H. Williams & Co., Brooklyn, N. Y., before the Metropolitan section of the Society of Automobile Engineers, October 31. In the paper itself and in answering the numerous practical questions in the lengthy discussion which followed its reading the author gave a direct and concise treatment of the general subject in its present high development with particular reference to the automobile industry. In the three opening sections of the paper, under the captions, "Historical," "The Bicycle Industry," "The Automobile," Mr. Trabold shows the apparently independent beginning of the art of die-blacksmithing or drop-forging in the middle of the last century in England, Germany and the United States, respectively, in the manufacture of the Enfield rifle about 1850 (the then standard English infantry equipment) in the work of the Colt Fire Arms Company at about the same time, and in seemingly authoritative prints and documents which go to show that the conception and development of drop-forging took place in Germany at a time antedating both the British and American claims. The paper in substance is as follows:

#### The Bicycle and Automobile and Drop-Forgings

The requirements of the bicycle industry—minimum weight combined with maximum strength and interchangeability of parts—found their answer in forged steel parts. The accuracy required to minimize the finishing labor (by hand and machining operations) called for die-forgings and drop-forgings; and when the sport of bicycling was so suddenly abandoned the building of automobiles, coming right on its heels, found an important manufacturing art ready to its hand. The efforts of many specially qualified men were immediately available for the larger, broader and more important work of building automobiles. Drop-forging, which had met the need in making the comparatively simple bicycle, has been carried to a far higher stage of development during the last 15 to 18 years, in keeping with the more exacting conditions of the automobile industry (as well as in the manufacture of fire arms, sewing machines, cutlery, agricultural machinery, etc.) and in keeping with extremely rapid advances in other branches of applied science which the automobile industry has caused.

Referring to the improvements in drop-forgings for automobile building, Mr. Trabold says: "The necessity for several high efficiency steel parts for the engine alone placed a considerable quantity of work in the drop-forging industry. Ever since the beginning of the building of cars on a commercial basis the tendency each year has been toward the adoption of more drop-forged parts. The making of longer dies than has been used generally before is an item of no little account. Formerly a die for a part as long as, or involving as much work as, a four-cylinder crankshaft caused a shudder. Now a six-cylinder crankshaft is common. Axle dies which at first were considered simply out of the question as beyond the possibilities of the process now cause no comment. In this development of proportions the automobile cannot be given exclusive credit, although it assisted materially. The greatest development in the manufacture of drop-forgings for which the automobile alone has been the cause is the handling of high efficiency steels, mainly of new alloy combinations. By progress in the art of special heat treatments and quenchings (peculiar in many respects) physical properties undreamed of prior to the advent of the automobile have been attained. The commercial stability and success of the car demanded something better than had existed."

#### What is Involved in the Die Making

In accomplishing such results as these die-making has undergone an evolution, but still remains an art. The problems of correct "draft" (clearance) and of the use of auxiliary dies must be solved by special skill. "The principal skill in die construction is not in the finishing impression, which is a matter of nice work, patience and special care for accuracy. Taste can be displayed in formations of intersections and finish of surfaces. But the design and formation of the edging and 'break-down' impressions require a knowledge of the work beyond that possessed by the most skilful general mechanic who is not experienced in this special line. Intimate knowledge of, and experience in, the work alone qualify one for the layout of this portion of the dies. Should the rough stock be pinched or 'broken' too short, laps or 'cold-shunts' are likely to occur; should too much stock be left after edging or breaking down, the work to reduce to the finished forging may be considerably greater than necessary. There is a point that represents just the right condition in which to have the stock formed prior to the finishing impression; the greater the skill the more nearly to this point approached. Cost conditions are thus influenced."

The use of "locked" dies,—covering all dies the faces of which are not in one plane and including many really complicated dies—has developed so that a single operation now replaces the old method of manufacture which was by flat dies followed by "formers." The degree of accuracy attainable in modern practice is stated to be within a few thousands of an inch. The proper guttering of dies —that is the provision made for the overflow of metal— is emphasized as an important factor. In figuring the necessary amount of steel the author mentions that the waste, called shrinkage, is about 25 per cent. in valve stems, about 50 per cent. in crankshafts and 150 per cent. or more in connecting rods.

#### Character of Steel in Drop Forgings

The remainder of the paper was in part as follows: Years ago what forgings were not tool steel were pretty much mild machine steel, 0.10 to 0.15 carbon, of Bessemer quality, with a few variations of somewhat higher carbon open-hearth steels for pedal-crank work, etc., and open-hearth steels of approximately 0.40 to 0.60 carbon when a low grade of tool steel was wanted. The automobile requirement of the purer open-hearth steels has almost eliminated the use of Bessemer steel in drop-forging work, excepting to a limited extent in parts where free-machining qualities are necessary, especially where threads are to be cut. We all know the consideration now given chemical composition.

One of the marked advantages of the drop-forging over the cruder hand-forging, on which much stock is often left to be machined, is that in the former the original fibrous structure of the rolled bar is preserved and intensified. This can be appreciated especially in a crankshaft, the fibrous structure being continuous throughout the entire shaft, including the arms and wristpins. In hand steam-hammer forgings which have the slabs left solid and the crank-pins and arms formed by machining from the slabs, short cross-grains result, sacrificing a certain amount of physical property, not noticeable, of course, in a test-piece cut from the shaft ends, but unquestionably affecting the part as a whole. A crankshaft etched to remove from its surface all traces of the constituents of the steel other than the pure iron, will illustrate the point.

#### Case Hardening of Drop Forgings

Care should be taken with all parts to be made from tool steel or any high carbon steels which are to be tempered for surface service, to have sufficient material allowed for cleaning off in the machine operations the decarbonized surfaces. Otherwise good hardening effects cannot be secured, as this surface after the annealing operation becomes spongy by reason of the carbon and other constituents giving the proper hardening effect being consumed.

Of course, where necessary, this decarbonizing surface can be recharged with carbon by packing in cast iron or steel boxes, the parts being surrounded with a substantial jacket of bone, leather, charcoal or some other carbon-containing mixture, and brought up to a temperature of about 1500 deg. F. The depth of carbon penetration, as in the case of ordinary case-hardening of milder steels, is controlled by the time of soaking in the furnace. For example, a 1-64-in. penetration requires heating at the temperature mentioned about 3 hr. Greater time in proportion is necessary for additional penetration.

#### Pickling for Machine Work

To facilitate machining work, and to remove the scale or oxidized surface from the forgings, which, on account of its glassy and hard condition, is most injurious to drills,

milling cutters, and cutting tools generally, the forgings, before shipment, are pickled. For this a sulphuric acid solution is generally used, in the proportion of 1 part acid to about 20 parts water; heated with a steam jet. Nitric and muriatic acids are also used in solution. Plain wood tubs or with lead lining, or concrete tanks are used.

## The Discussion

A large number of practical points were brought out in questions which were answered by the author of the paper. These points included the proper guttering of dies to prevent injury by chilling of the so-called flash, before the piece is brought down to size and the possible accuracy (closeness to size) under differing conditions, and the proper balance between the cost of extreme accuracy in the forging itself and the cost of attaining the necessary accuracy by machining the piece after it leaves the die. The checks he described as causing ridges in the forgings on perpendicular edges and at the juncture of the forging and the flash and as a result of not allowing sufficient clearance or draft in the dies. Sometimes the forgings stick in the dies, injuring the dies materially, and the swabbing of oil to lubricate the die sometimes creates a severe contraction resulting in little cracks in the dies, which cause slivers to be formed on the forgings.

### Furnaces for Heating the Steel

Oil furnaces, he said, are used generally now for heating the steel almost entirely in the larger shops, as a result of greater convenience and cost principally. Some work with low pressures, approximately 8 oz., while others use high pressure up to 18 or 20 lb. One prominent manufacturer of fuel-burning equipment for forge furnaces recommends both at times. "I am not sure which they consider the best, inasmuch as I have known of high-pressure systems up to 18 lb. being installed on their recommendation and I know of one system using a low pressure now being installed on their recommendation. The low-pressure is considerably less expensive in installation, the blast being taken direct from fan blowers, while the high-pressure systems require a compressor and equalizing tank to overcome the pulsations of the generator."

### Forging Alloy Steels

There are not many difficulties in forging alloy steel combinations, he continued. The principal deterrent is the curtailment of product by reason of more careful heats required and the greater amount of working necessary to bring down to finished size, both of these conditions creating high costs which often seem unreasonable when compared with forgings from mild or simple steels. For several years the greatest difficulty with nickel steel of the standard 3½ per cent. quality was the prevalence of seamy surfaces, some of these seams running very deep. It seemed impossible to get material of this grade from any source that did not contain deep fissures or seams on the surfaces. But this has been overcome almost entirely. While a few years ago it seemed impossible to get nickel steel in bar form that did not require turning before putting the expensive forging labor on it, improved practice in the manufacture of it, either in the mixing or the rolling, has almost eliminated this annoyance, although nickel steel is still more susceptible to seamy surfaces than common carbon steels.

### Life of Dies

From a die for a double-head wrench or any forgings of a similar character so far as approximate proportions and dimensions are concerned, we can get about 20,000 forgings, provided we have no accident in the way of a die breaking, which at times occurs in the hardening or before we make more than a few pieces; while in crankshaft work the approximate life of a die would cover the making of 3000 to 5000 forgings, when re-dressing or reworking entirely becomes necessary. Die blocks of the size in question seldom go into anything beyond a 0.60 carbon steel. Blocks of large proportions are usually treated; they do not take the chance of hardening and often a 0.40 to 0.50 carbon block is used. For dies to make small articles, such as wrenches or other pieces, a block of approximately 0.60 carbon steel is generally used and hardened.

### Fractures of Forgings Due to Upsetting

In discussing hand-forging done subsequently to the drop-forging, and other supplemental operations, and such work as the making of gear blanks by a series of upsetting operations, the author of the paper brought out the injurious effects of upsetting in sacrificing the strength due to the original fibrous structure of iron. "With all rolled bars of steel you have the fibrous structure to contend with, and you can imagine what effect upsetting would have on the fibre. I have seen tons of iron used in upsetting work in attempts to make stay bolts, but the metal at the upset head would disintegrate and separate; and finally that method of manufacturing these parts was abandoned on account of the great number of pieces that had longitudinal fractures caused only by the upsetting operations. This was an exceptional case, but it showed the tendency of the upsetting operation to rupture the fibred iron while in the case of steel I do not believe, if care is taken, it has any bad effect. I have never heard it recommended as a preferable practice and my experience has always been to the contrary."

Other matters discussed were the absence of standardization in the drop-forging of detail parts for motor trucks, such as spring shackles, clips and levers; the usual practice relative to ownership of dies; the bettered physical properties of drop-forged crankshafts as affected by refinement of the metal in the forging; the making of dies with inserts of different steels (an old practice, now less countenanced); the necessity of determining the proper size of stock for a new job by actual test with the finished dies, instead of ordering the steel and the dies at the same time, and large forgings, the largest the author had seen, being a two-cylinder crankshaft for a traction engine, about 6½ ft. in length and weighing 560 to 580 lb. placed under the drop hammer for finishing.

In discussing the present lack of standardization of dies and the possibility of establishing such standardization, Mr. Trabold said: "I actually think that if we went in seriously with the designers and impressed the owners of automobile companies with the fact that by accepting slight changes which would not in any way affect the efficiency of their product, and make possible the securing of forgings immediately without the loss of time necessary to make dies, or without the expense of dies involved, they would be inclined to accept some general design considered standard; in fact, I am sure they would welcome it."

---

## New Process Gear Corporation

The New Process Gear Corporation has been incorporated under a New York charter, with a capital stock of $1,000,000, all subscribed, and will take over the stock of the New Process Raw Hide Company, Syracuse, N. Y. The reorganization and reincorporation, with the increase in capital, were deemed advisable because of the great expansion of the business of the company. The new name is adopted because it defines better the line of manufacture in which the company is engaged. Originally the manufacture of rawhide gears was the principal business of the company. Now it makes both metal and rawhide gears, the production of the former being many times greater than that of rawhide.

By the reorganization there is no change in ownership. The control of the New Process Gear Corporation will be in the hands of men who control the New Process Raw Hide Company. The principal owners are Thomas W. Meachem and his sons, T. G. Meachem and J. F. S. Meachem. The officers of the new company, like those of the old, are: President, T. W. Meachem; vice-president, T. G. Meachem; treasurer, A. C. Vosburgh; secretary, J. F. S. Meachem. The directors are the same, with the addition of W. H. Diefendorf, who is chief engineer of the company. The plant at Syracuse is now being enlarged to double the former capacity. When completed, over 500 men will be employed.

---

The steel mills and coal mines of Allegheny County, it is said, will put $9,000,000 in Christmas pay envelopes next week, being the heaviest Christmas pay by 15 per cent. in the history of the Pittsburgh district.

# The Machinery Markets

In several sections of the country there is a fair amount of activity considering the season and everywhere it is recognized that any slowing up tendency felt at this time is to be expected. Some prospects which have taken definite form are such as to inspire confidence, particularly those in the large railroad lists now before the trade, and to which another has been added by the National Transcontinental Railway of Canada. New York is quieter but has some good inquiries. In Philadelphia an excellent business has been done in single tools and the Pennsylvania Railroad has a small inquiry out. The machinery trade continues prosperous in New England despite a somewhat duller market. Cleveland has had some excellent transactions and there is a fair amount of inquiry although the bulk of trading is in single units. Orders are coming in more slowly in Cincinnati but many manufacturers are still busy with work in hand. In Chicago there has been a satisfactory aggregate in small sales and the market is strengthened by the prospect of railroad buying. Conditions are rather dull in Detroit though there is a good run of small orders. Favorable weather conditions have helped along the machinery trade in the Central South although business has fallen off generally. Birmingham is quiet but considerable demand is in prospect. Similar conditions exist in St. Louis. Dealers on the Pacific coast report a very satisfactory volume of business for the season.

## New York

NEW YORK, December 18, 1912.

There are some excellent inquiries before the trade, but a quieter tendency has developed in the last few days. The lessening activity, however, is generally regarded as seasonable and there is not the slightest feeling of depression; on the contrary there is a good deal of confidence, largely as a result of the big propositions now out and which will be productive of a large amount of business when they reach the closing point. New York houses have received the big list of the National Transcontinental Railway for its new shops near Winnipeg, Man., which comes close on the heels of the large Boston & Maine list. The Mergenthaler Linotype Company has issued a small list of tools needed in its Brooklyn factory. Another list which is given herewith is that of the Sterling Metal Products Company, which should be addressed care the Star Ball Retainer Company, Lancaster, Pa. It is understood that the tools needed for the tool room will be purchased without delay, while buying the other equipment will go over to next year. The list follows:

### Sterling Metal Products Company's List

*Tool Room Equipment*

One 14-in. x 6-ft. Hendey-Norton lathe.
One 16-in. x 8-ft. ditto.
One No. 2-A Brown & Sharpe universal milling machine.
One 14-in. Gould & Eberhardt shaper.
One 20-in. ditto.
One Brown & Sharpe universal and tool grinder.
One No. 1 Norton tool grinder.
One Whitney wet grinder.
One Cincinnati single spindle ball bearing drill press.
One Rockwell high speed hardening furnace.
One Robertson No. 2 economy hack saw.

*Manufacturing Equipment*

Two 2¼-in. Gridley single spindle automatic.
One two spindle 22½-in. Barnes drilling machine.
One 3-spindle 22½-in. ditto.
One 6-spindle box head Bausch multiple drilling machine.
One 2-spindle Cincinnati ball bearing drilling machine.
One J. N. LaPointe broaching machine, No. 1.
One No. 3 ditto.
One 14-in. Acme turret lathe.
One 18-in. Acme turret lathe.
One No. 1 Garvin duplex horizontal drill.
Two Carter & Hakes plain millers.
One Whitney hand miller.
One B. & S. No. 11 cylinder grinder.
One Heald No. 75 internal grinder.
One Hendey-Norton centering machine.
One Diamond vertical surfacer.
One M. A. N. straightening press.
One No. 3 Ferracute punch press.
One National forging machine.

### National Transcontinental Railway List

The National Transcontinental Railway has prepared specifications in pamphlet form in connection with its requirements of equipment for the car shop plant of its Transcona, Man., shops, about six miles east of Winnipeg. Estimates must be submitted to the commissioners of the railway at Ottawa, Ont. The car shops are now being erected under the supervision of W. J. Press, M. E., and Gordon Grant, chief engineer, who devised the specifications. A summary of the equipment required follows:

*Wheel and Machine Shop*

Three car wheel boring machines, to bore car wheels up to 42-in. tread, swing 48 in.
Two double axle lathes to turn 8 ft. 4 in. between centers.
One 200-ton hydraulic wheel press.
Two 42-in. steel tire coach wheel lathes, designed for turning steel tire car wheels from 28 to 42 in. in diameter.
One 30-in. planer with 8-ft. table.
One 51-in. boring and turning mill, geared feeds.
One 24-in. double head, transverse head shaper, bed 36 in. x 12 ft.
One double emery grinder capable of carrying two 2 x 12-in. wheels.
One horizontal milling machine. Working surface of table approximately 18 x 60 in.
One vertical milling machine. Working surface of table 20 x 60 in. approximately.
One horizontal milling machine with vertical milling attachment, 40 x 14 x 20 in.
One 30-in. heavy standard engine lathe to swing 7 ft. 6 in. between centers.
One 18-in. heavy duty engine lathe to swing 4 ft. between centers.
One 6-ft. triple geared Universal drilling and tapping machine.
One 6-ft. strong and powerful radial drilling, boring, tapping and studding machine.
One 72 x 72 in. x 16 ft. open side planer, with two heads on cross rail and one on side of column.
One 6-spindle automatic cock grinding machine.
One die hobbing machine.
One New Yankee drill grinder, capacity to 3½ in. in diameter.
One 36-in. back geared high duty drill.
Two 30-in. high duty vertical drilling machines.
One 20-in. back geared drilling machine.
One 6-spindle semi-automatic nut tapper, capacity ⅜ to 1 in.
One 6-spindle semi-automatic nut tapper, capacity ¾ to 1½ in.
One 24-in. geared slotting machine circular table approximately 36 in.
One universal power hack saw having a capacity for 6-in. round bars.

*Forge Shop*

One automatic feed continuous motion heading machine, having a capacity up to and including 1 in. in diameter rivets.
One improved 2½-in. bolt heading, upsetting and forging machine.
One 1-in. bolt heading, upsetting and forging machine.
One No. 5 improved type bulldozer.
One 100-lb. rubber-cushioned hammer.
One double end punch and shear with 15-in. depth of throat.
One quick acting guillotine frame bar shears, approximately 30 in. wide.
One special spring stock shear.
One 2½-in. double bolt cutter.
One 1½-in. triple bolt cutter.
One 1-in. double bolt cutter.
One 2-in. bolt pointing machine.
One 1½-in. bolt pointing machine.
One 1-in. bolt pointing machine.
One 3000-lb. single frame steam hammer.
Five furnaces.

*Street Car Shop*

One double angle shear. Capacity equal to shear 6 x 6 x 1-in. steel angles.
One double end punch, 24-in. throat on each end.
One combination high speed cutting-off saw.
One gate shear, 120 in. between housings.
One horizontal punch having a throat 36-in. deep.
One plate planer having capacity for ⅛-in. feed on ¾-in. plate at 40 ft. per minute, 32 ft. cut at one setting.
One plate straightening rolls. Capacity ⅝-in. plates.
One horizontal punch having throat 24-in. deep.
One structural-steel punch of capacity equal to punch at one stroke two 1-in. diameter holes through 1-in. steel.
One double end punch and shear, having 18-in. depth of throat on each side.
One plate bending rolls of sufficient width between housings and capacity for bending 10 ft. of 5/16-in. steel plate.
One horizontal bending and straightening machine, for 15-in. I-beams and channels either way.
One riveting machine, 72-in. reach, 18-in. gap, capacity 1-in. rivets with 80-lbs. air pressure.
One metal cutting band saw, having 36-in. diameter cutting wheels.
One standard 8-spindle arch-bar drill approximately 10 ft. long.
One double end punch and coping machine having capacity for punching 1¼-in. diameter through 1-in. steel and for shearing 1-in. plates, 1⅞-in. round bars, etc.
One bulldozer, size No. 9, crosshead face 89½ x 16 in., movement of crosshead of 24 in.
One bulldozer, size No. 5, or equal, having crosshead face 63 x 12 in., movement of crosshead 20 in.
One rapid action punch having capacity for punching ⅜ in. diameter through ⅝-in. steel at rate of 65 strokes per min.
One draw bench 50 ft. long, pulling capacity 10 tons.
One 4-ft. radial drilling machine, high speed type, capacity 1-in.

diameter hole, drill to center of 8-ft. 1¼-in. circle.
One double emery grinder, 24-in. stone, 3-in. face.
Two hand-operated gantry cranes each supplied with chain hoist for suspension of 18-in. reach, 15-in. gap Hanna type riveter.
One pipe bending machine, complete.
One oxygen welding outfit.
Two stationary rivet furnaces.
Six portable rivet furnaces.
One Gould type triplex 3 x 8-in. hydraulic pump, capacity 35 gal. per minute against 1500 lbs. pressure.
One 1000-cu. ft. capacity, 110 lbs. pressure direct connected motor-driven air compressor.
One double furnace, 8 ft. x 6 ft. x 2 ft. 6 in. per chamber.
One double furnace, 9 ft. x 3 ft. x 12 ft. per chamber.

Aside from minor equipment for the steel car shop, forge and the machine shops, there also is called for approximately 50 machines for the sawmill and carpenter shop and equipment for the upholstery shop and a 20-ton crane and two 10-ton cranes, all electrically operated. Practically all of the machinery for all purposes is to be motor driven.

The Holt Mfg. Company, Stockland, Cal., has acquired a tract of 17 acres in the Hackensack meadows between the Newark Plank Road and the Pennsylvania Railroad. The company plans to immediately start the construction of a building, 160 x 160 ft., two stories, of concrete and structural steel. It will be used as a temporary factory and later will be converted into a storehouse. The plans embrace the erection of several other buildings in the near future for the manufacture of the Holt caterpillar tractor, and other harvesting machinery.

The barrel manufacturing plant of the Tidewater Oil Company, Bayonne, N. J., was destroyed by fire December 12, causing a loss of $400,000, which includes buildings, machinery and a large quantity of staves and headings. The capacity of the plant was 3000 barrels per day.

In a recent issue of *The Iron Age* it was erroneously stated that the Ogden Iron & Steel Mfg. Company would occupy jointly with the Star Expansion Bolt Company the new premises at Forty-ninth street, Bayonne, N. J. The name of the company is the J. Edward Ogden Company, which has at this time no connection with the Ogden Iron & Steel Mfg. Company.

The board of managers of Letchworth Village, an institution for the segregation of epileptics, located at Thiells, near Haverstraw, N. Y., will soon advertise for bids for the construction of the first group of six groups of 10 buildings each, to be built for the institution. This group will consist of four dormitories, an attendants' home, a dining hall, laundry building, machine and carpentry shop, a power plant and a storehouse. The estimated cost is $457,000.

Vail & Ballou, Binghamton, N. Y., are ready for figures for a factory building 45 x 231 ft., one story and basement, of brick and steel, which they will erect at once. The estimated cost is $20,000.

The Truitt-Schwab Shoe Company, Binghamton, N. Y., is having plans prepared for a factory to be erected on Noyes Island. Arthur J. Schwab is president.

The General Carbonic Company, Albany, N. Y., has let a contract for a one-story addition to be made to its carbonic plant at Bridge and Mill streets.

The J. B. Lyon Company, Albany, N. Y., is receiving bids for a factory building 100 x 100 x 50 ft., five stories, which it will erect and equip.

The Beechnut Packing Company, Canajoharie, N. Y., producer of fruit preserves, has purchased a site at Main and Palmer streets, Rochester, N. Y., upon which it will erect a four-story and basement preserving plant, 60 x 100 ft., of reinforced concrete construction. It will contain heating and power plant and office building. Two 150-hp. boilers will be installed, but the plant will be operated by electricity.

The Dry Milk Company, Bovinia Center, N. Y., will build a factory, 55 x 103 ft., one-story and basement, for the preparation of condensed milk and have awarded contracts for construction.

The Dollard Construction Company, Syracuse, N. Y., has been awarded the general contract for the construction of a factory building, 68 x 152 ft., one story, and a warehouse and manufacturing building, 68 x 153 ft., three stories, to be erected at Rome, N. Y., for the American Can Company.

The plant of the Vance Boiler Works, on Torrey Park, Geneva, N. Y., destroyed by fire recently is to be rebuilt.

The International Casement Company, Jamestown, N. Y., recently incorporated, has secured factory space in the building formerly occupied by the Linford Cut Glass Company on East Sixth street and will at once equip it for the manufacture of metal window and door casings.

Figures are being received for the construction of a factory building, 82 x 270 ft., three stories and basement, to be added to the plant of the William A. Rogers Company, Ltd., at Main street and the Hydraulic Canal Basin, Niagara Falls, N. Y.

The cooperage plant of Gref Bros., at Buffalo avenue and Twenty-fourth street, Niagara Falls, N. Y., which was destroyed by fire recently, with machinery equipment, is to be rebuilt at the north end of the city upon a site just secured.

Plans are being prepared for a shop and storehouse building to be erected by Otto G. Waldow, manufacturer of plumbers' supplies, 215 Fillmore avenue, Buffalo, N. Y.

Wollenberg Bros., Buffalo, N. Y., will erect and equip a four-story grain elevator at Goodyear avenue and the West Shore Railroad.

The Empire Radiator Company, Buffalo, N. Y., has been incorporated with a capital stock of $1,000,000 to manufacture copper radiators by a new electrolytic process for use in automobiles and in direct and indirect heating systems for dwellings, offices and public buildings. The new company will take over and merge with it the Electrolytic Products Company, its business and its plant at Elmwood and Hertel avenues and the Erie Railroad. The plant, which has been operated for the manufacture of automobile radiators, will be greatly enlarged and further equipped for the manufacture of heating systems. The officers of the company are: President, Edward B. Green; vice-president, Frank A. Abbott; secretary-treasurer, Duane B. Tuttle, with offices in the D. S. Morgan Building.

The J. H. Williams Company, Brooklyn, N. Y., manufacturer of drop forgings, has plans in progress for the forge plant which it will build in Buffalo next spring at Kenmore avenue, O'Neil street and the New York Central Railroad. Bids will be received after January 1. It is stated the plant complete will cost about $1,000,000.

### Catalogues Wanted.

E. H. Kirkby, Goldburg and Pitts streets, Sidney, Australia, requests manufacturers to furnish him with catalogues covering lathes, bench tools, etc.

---

## New England

BOSTON, MASS., December 18, 1912.

The dealers are experiencing a somewhat duller market. Some hesitation on the part of buyers seems to be in evidence, yet there are indications that the change is somewhat due to the season, the closing weeks of the year usually seeing some cessation in business, partly because of the holidays and partly because it is a period for inventory. The machinery builders are not unanimous in their experience, certain lines seeming to be affected more than others. Those which were so exceedingly prosperous in recent months have quieted down a little, while others who were slower to feel the increasing business are apparently not affected. Taking the situation as a whole, the machine tool trade is still prosperous and the same is true of the supply trade. The automobile builders are not ordering as freely as they have been, and this has had its influence with those houses which manufacture the more special types of equipment.

The machine tool men are taking a keen interest in the question of tariff revision. It will be remembered that at the last session of Congress the trade was unable to impress upon the Ways and Means Committee the exact meaning of the words "machine tools." The result was that their product was classified in a miscellaneous list and if the bill had become a law would have been put on the free list. Such legislation would be more or less serious, especially to the builders of older types of machines and of these particularly those that sell for a low price. The manufacturers are approaching the new situation with a determination to leave no doubt in the minds of those members of Congress who will dominate the situation as to the tariff as to what a machine tool is, and what would be the result were this class of machinery to go without protection. The trade is united in its belief that if the schedule is to be reduced the cut should be a very small one.

The Fafnir Bearing Company, New Britain, Conn., has increased its capital stock from $100,000 to $200,000, and the Holmes Motor Company, Groton, Conn., from $80,000 to $130,000. Edward F. Miller & Co., Meriden, Conn., has issued $250,000 in new stock.

The Rhodes Mfg. Company, Hartford, Conn., has

been incorporated to take over the long-established business of L. E. Rhodes, manufacturer of machinery. The capital stock is $250,000, and the incorporators are Leverett E. Rhodes, Amasa Trowbridge and Arthur I. Jacobs.

The consolidation of the water-powers of western New England by the Chace & Harriman interests, Boston, has been further extended by the purchase of the Bellows Falls Canal Company and of a majority of stock in the Fall Mountain Electric & Power Company, of the same place. The transaction is an important one because not only is the power already developed at Bellows Falls a large unit, but it is stated that another power plant will be established at Fifteen Mile falls at some future time. The company's properties, together with projected development, combine an amount of power which will have an exceedingly large part in making rapid the growth of New England industries. Within a few years the total will be well up above 250,000 hp., which will be transmitted electrically to all industrial centers of western and central Massachusetts, Vermont, New Hampshire and Connecticut.

The building of the Gray Telephone Pay Station Company, Hartford, Conn., has been badly damaged by fire with a loss of $50,000. The company is erecting a new factory, which is well under way, and the fire should make a large difference in the amount of machinery which will be purchased for its equipment, as very serious injury was done to the machine tools and other equipment of the old plant.

The American Screw Company, Providence, R. I., has purchased a tract of land adjoining its plant, but no announcement has been made of plans for immediate extensions.

The Waterbury Buckle Company, Waterbury, Conn., has started the erection of its new factory building, which will be 58 x 123 ft., three stories and basement.

The American Brass Company has completed plans for the construction of a factory building on South Main street. It will be 199 x 224 ft., one story, and will be used as a tube mill.

The understanding is that the reorganization committee for the United States Motor Company plans to buy at the advertised auction sales the various plants included in the company's property. The New England factories are operating with the exception of that of the Maxwell-Briscoe Works, at South Auburn, R. I., which will remain shut down, according to present plans. A large number of the workmen have been discharged and machinery is being shipped to others of the plants.

Additions to New England's industrial plants include the following: The Winterbottom Book Cloth Company, Ltd., East Killingly, Conn., addition to Whitestone mill property to double its capacity; the Brainerd & Armstrong Company, New London, Conn., silks, one-story addition, 50 x 140 ft.; Davol Rubber Company, Providence, R. I., three-story addition, 50 x 281 ft.; Summit Thread Company, Easthampton, Mass., tentative plans for a new factory building; Baer Bros., Stamford, Conn., new factory; New Britain Gas Light Company, New Britain, Conn., purifying house, 35 x 85 ft.; George E. Duffy Mfg. Company, Worcester, Mass., additional story to factory, 34 x 70 ft.

The Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., has let the contract for the addition to its foundry building on Southgate street, which was recently acquired in exchange for its old foundry property. The structure will be 90 x 101 ft., one and two stories in hight.

The name of the Gaynor & Mitchell Mfg. Company, Bridgeport, Conn., manufacturer of metal specialties, has been changed to the Gaynor Mfg. Company.

## Philadelphia

PHILADELPHIA, PA., December 17, 1912.

While there has been a better volume of business in machine tools, some irregularity is still apparent. The bulk of the sales have been of single tools, in which lathes, shapers and drilling machines have been the most active. Some pending traveling crane business has also been closed. Manufacturers of machinery continue actively engaged, particularly those making special tools. Inquiries for tools show a slight betterment, although there is an absence of any sizable lists of equipment. The local locomotive builder has booked considerable additional business. Railroad buying has been light, one inquiry for a few tools for the Pennsylvania Railroad is noted. Power equipment remains quiet. Business in second-hand machinery continues fair. Little new business in the export field has developed. Foundry plants are actively engaged and a very fair demand for both steel and iron castings is reported.

Plans are being prepared, it is stated, for a two-story brick and concrete garage, 90 x 114 ft., to be erected and equipped for the Freihofer Baking Company at Twentieth street and Indiana avenue.

The Standard Roller Bearing Company has disposed of its foundry equipment, including that of its gray iron, steel and brass departments, to the Kennedy Foundry Company, Baltimore, Md. The former company will use the space occupied by its foundry department for the manufacture of Rudge-Whitworth wire wheels, for automobile use

It is reported that the contract for a nine-story fireproof, manufacturing building, 100 x 396 ft., to be erected at Broad and Wallace streets, for a syndicate headed by George F. Lasher, has been awarded to the Harrison & Rea Company. The matter of the construction of this building has been under consideration for a long time and it now looks as if the actual work would be begun at an early date. Under the original plan considerable power equipment was involved.

The Eynon-Evans Mfg. Company is busy in all departments. It has recently installed a new core making department in the third floor of its brass foundry, fully equipped with mixing machinery and baking ovens, and is being used for the manufacture of small cores. This concern will install in the near future a J. W. Paxson & Co., sand blast plant, and is considering the purchase of considerable additional molding machinery. Very satisfactory demands for steam jet blowers and large gate valves are reported. The pattern shop is busy on a general line of work.

It is reported that the Consolidated Gas, Electric Light & Power Company, of Baltimore, has had plans prepared by its own engineers, for a one-story, reinforced concrete boiler house, to be erected at the foot of Leadenhall street. The building will be 50 x 78 ft., and will be equipped with two 450 hp. boilers.

The Penn Planing Mill Company, Reading, Pa., has completed the rebuilding and equipping of its plant at Grape and Second streets, in that city Fire destroyed the old plant of the company about a year ago.

It is currently reported that the Camden Curtain & Embroidery Company, Camden, N. J., will erect a five-story brick manufacturing building, 65 x 105 ft., in that city. Details as to equipment required are not available.

The Department of Public Improvement, Baltimore, Md., will receive bids until December 23 for furnishing and delivering at its city yard, a concrete mixer having a capacity of 22 cu. ft., fitted with the necessary arms and pipes for street paving work. Specifications may be obtained from Mr. H. K. McCay, City Engineer.

Plans are being prepared by Charles Balderson, architect and engineer, for a reinforced concrete factory building, 70 x 107 ft., to be erected at Juniper and Federal streets. Specifications will include steam heating and electric lighting

## Chicago

CHICAGO, ILL., December 17, 1912.

Some divergence is noted between the various reports of the machinery trade in the past week, the difference being not so much a question of quantity of sales, the total being well maintained, but rather a question of the character of the business. One reports that the business of the week was largely made up of two large orders for general manufacturing purposes while in other directions the small individual orders of one and two machines have resulted in a very satisfactory aggregate of sales. There are those who find the demand for second hand tools at a very low ebb while at the same time a more pronounced disposition to buy new high grade tools in trades involving the moving of used machinery is apparent. It is probably true that in many competitive lines manufacturers are realizing more keenly the necessity of being as well equipped as their neighbors and are also increasingly aware that their profits are to be made primarily from the output of their machine equipment, that the more efficient and the larger the production for a given floor space and a given number of operators the more secure their position in their line of trade. At the same time the sale of second hand auxiliary equipment—saws, grinders, small lathes and drills, bolt cutters and the like—is apparently as active as at any time. No railroad purchases in addition to those closed a week ago, are noted

but the market is strengthened by the certainty of large orders on the eve of being closed. Advances in the prices of tools—including planers, shapers, lathes and radial drills—are becoming more general. Among the miscellaneous sales of the week are noted a 60-in. boring mill, a large Libby turret lathe and a heavy crankshaft lathe.

The Craig Engineering Company, Chicago, has been organized with a capital stock of $20,000, to manufacture boiler and engine specialties. The incorporators are: Albert E. Massey, George W. Jackson and William L. Barteau.

The Chicago Economy Machinery Company, Chicago, has been incorporated with a capital stock of $25,000 by Joseph Burke, A. W. Dixon and P. J. O'Brien.

The Brown-Lewis Railway Supply Company, Chicago, has been incorporated with a capital stock of $2,500, to manufacture motor, tractor and other trucks. The incorporators are: Frank T. Murray, Charles W. Paltzer and Frank S. Righeimer.

P. Hale is the architect for a one-story machine shop to be erected at 621 South Forty-fifth street, Chicago, at a cost of $3,200.

The Central Iron Works, Quincy, Ill., is making preparations for the enlargement of its present plant which will increase both its foundry and machine shop facilities. The company manufactures foundry equipment and concrete mixers.

The Polo Machine Company, Polo, Ill., has increased its capital stock from $10,000 to $40,000 and contemplates an increase in its manufacturing facilities.

The Union Malleable Company, East Moline, Ill., is building an addition to its foundry to be 65 x 82 ft.

The Danville Malleable Iron Company, Danville, Ill., has been organized with a capital stock of $150,000. A plant affording 60,000 sq. ft. of floor space will be erected.

The Rockford Gas Light & Coke Company, Rockford, Ill., has secured additional property which will make possible extensive additions. New handling equipment will be installed, including locomotive yard cranes.

The Mt. Vernon Car Company, Mt. Vernon, Ill., has placed the contract covering the erection of a one-story erecting shop which is to be 140 x 450 ft.

Charles T. White, South Bend, Ind., is promoting a company to manufacture an air sterilizer that he has invented.

The Hoke Tractor Company, South Bend, Ind., has been incorporated with $60,000 capital stock, to manufacture gasoline engines and tractors. The directors are: J. I. Hoke, L. I. Hoke and O. C. Chambers.

The Portage Boat & Engine Works, Portage, Wis., has begun the construction work upon its new factory which will be 40 x 120 ft., two stories.

The Sta-Rite Engine Company, La Crosse, Wis., has filed notice of an increase in its capital stock from $200,000 to $250,000.

Solf & Stelich, Neillsville, Wis., have purchased a manufacturing site in that city upon which they will build a plant for the manufacture of blacksmith tools and forging machinery.

The Thompson Bros. Boat Mfg. Company, Marinette, Wis., is building a new factory which will soon be ready for the installation of machinery.

The Northwestern Malleable Iron Company, Milwaukee, Wis., has arranged for the building of an addition to its annealing facilities to cost $15,000.

The Key-Calk Horseshoe Company, Green Bay, Wis., has underway improvements in its plant facilities which will require additional power apparatus.

## Cleveland

CLEVELAND, OHIO, December 17, 1912.

Dealers received a good volume of orders in the week. One machinery house reports sales amounting to over $40,000 in machine tools, which included an order for about 30 machines placed by an Ohio automobile builder. Another order was for six lathes. The demand for single tools is quite active. There is a fair volume of inquiry pending for small lots of tools. In general machinery considerable new business is coming out. Improvements to Lake Erie docks planned for the coming year include the installation of 2 or 3 car dumpers. In electrical lines there is a good demand for small equipment. A large volume of business has recently come for locomotives and other electrical equipment from coal mining companies in the Central West. Manufacturing plants in various metal working lines continue very busy.

The Toledo Metal Furniture Company, Toledo, Ohio, will rebuild its plant and make extensions which will about double its present capacity. A main building 60 x 175 ft. of concrete construction will be erected to provide additional press room capacity. The plate and polishing rooms will be enlarged.

The Perfection Spring Company, Cleveland, Ohio, maker of automobile springs, about January 1 will complete extensions which have been under way during the year that will double the capacity of its plant and add 110,000 sq. ft. to its floor space. The company reports that practically all its output for 1913 is already sold.

The Buckeye Aluminum Company, Wooster, Ohio, has awarded a contract for the erection of a large two story brick addition to its plant. Some additional machinery will be installed.

A new plant will be erected in Elyria, Ohio, by the American Fireproof Door Company for the manufacture of a line of fireproof doors. The company was recently organized with a capital stock of $400,000. A. L. Garford is president.

The village of Elmore, Ohio, will issue $25,000 in bonds to install a new water works system.

The mill building, packing, shipping and storage departments of the Ohio Marble Company, Piqua, Ohio, was destroyed by fire December 6, the loss being about $50,000. The company expects shortly to rebuild the plant.

The Goetschius Stone Company, Lima, Ohio, will make extensive improvements to its plant and will install some electric equipment and machinery.

The Elyria Belting Machinery Company, Elyria, Ohio, has been incorporated with a capital stock of $10,000 by Alex Altfeld, H. A. Pounds, J. C. Ross and others.

A new two story factory building is being erected by the Electric Products Company, Dupont avenue, Cleveland.

The City Council of Sharon, Pa., will receive bids for equipment for a municipal light plant, the estimated cost of which will be $80,000.

The Lorain County Packing Company, Lorain, Ohio, will erect a $30,000 addition to its plant.

The City Council of Toledo, Ohio, will issue $150,000 in bonds for enlarging the city's water works plant. A 30,000,000 gal. pump, traveling crane and some other equipment will be installed.

The Cleveland Construction Company, Cleveland, has received bids for three 10,000 kw. turbines for a new power plant to be built by the Havana Electric Railway Company, Havana, Cuba.

## Cincinnati

CINCINNATI, OHIO, December 17, 1912.

As usual at this season, orders for machine tools are coming in rather slowly, and it will probably be well along in January before there will be any pronounced demand from the general trade. However, several of the local plants are operating a few of their departments overtime, on orders previously booked, and total business for the year will be much more satisfactory than the previous year. Woodworking machinery is in fairly good demand, with most of the business coming from Southern customers. Several contracts for electrical equipment and ice-making outfits have been let lately in the Central West, and there are a number of deals yet to be closed. A slight improvement is shown in second-hand machinery.

The Cincinnati Ice Company, Cincinnati, will soon be in the market for a large ice plant to be erected at Lockland, Ohio. The company also intends to erect extensive coal tipples, and will require coal-conveying machinery, as well as power plant equipment.

The Triumph Ice Machine Company, Cincinnati, was the successful bidder on a 150-ton ice plant addition to be made by the Cincinnati Brewing Company, Hamilton, Ohio.

The Ohio Tool Company, Columbus, Ohio, whose removal plans were recently mentioned, has let contract for a plant to be erected at Charleston, W. Va., that will be 100 x 360 ft., one story and of brick and steel construction.

The Valley Machine Company, Parkersburg, W. Va., whose building plans were mentioned several months ago, has been incorporated with $150,000 capital stock, to operate a machine shop and foundry. R. G. Stiles and John Marshall, of Parkersburg, are named among

the incorporators. The company manufactures woodworking machinery.

The Portsmouth Street Railway Company, Portsmouth, Ohio, has had plans prepared for a large car barn, for which considerable structural material will be required.

All of the sales agents of the Lunkenheimer Company in Canada and the United States were guests of the company's officials at Cincinnati last week. After the business sessions were concluded a series of entertainments was provided by the management, including a beefsteak fry at Wiedermann's Winter Garden. The reports from Canadian representatives would indicate excellent prospects for the coming year in nearly all lines of business in that country.

It is reported that the Thompson Mfg. Company, Newark, Ohio, will soon remove its plant to Detroit, Mich., and will greatly increase its output of patented hose clamps.

It is stated that the Barney & Smith Company, Dayton, Ohio, car manufacturer, has tentative plans under way for further extensive additions to its plant.

The Superintendents' & Foremen's Club, of Oakley, a Cincinnati machine tool manufacturing suburb, held its annual meeting on December 12 at Weber's Café. Over 100 members and guests were present at the dinner served. Interesting addresses were made by Dan Hermann Schneider, of the University of Cincinnati; Dean Howard Renshaw, of the Continuation School, and W. B. Dickson, local secretary of the National Metal Trades Association. The following officers were elected to serve for the ensuing year: President, William Eggerbrecht; first vice-president, George Langen; second vice-president, Fred. Smith; recording secretary, W. B. Sparks; corresponding secretary, L. H. Benson; financial secretary, H. M. Roberts; treasurer, S. E. Weir, and governors, W. Rader, C. Doering, F. J. Scott, D. C. Klusmeyer and George Reynolds.

Schmidt & Son, Cincinnati contractors, have been awarded contract for some extensive addition to the shops of the Cincinnati, Hamilton & Dayton Railroad Company at Lima, Ohio.

It is reported that the National Cash Register Company, Dayton, Ohio, will soon call for estimates on three new manufacturing buildings, for which plans are being prepared. Nothing is yet known as to the machinery requirements.

A number of machine builders and other manufacturers are interested in the Cincinnati Export Club, recently organized. At a recent meeting the following members were elected: President, Thomas P. Eagan; vice-president, W. B. Campbell; treasurer, A. P. Hagemeyer, and secretary, Bernard Freudenstein. A special committee consisting of J. B. Doan, J. S. Louis and W. B. Campbell was appointed to formulate rules and regulations for the club.

On December 6 fire destroyed the building occupied by the Doty Mfg. Company and Morgan & Smith, Dayton, Ohio. The first-named company manufactures hardware specialties and the latter metal patterns and models. Both firms will seek new quarters and considerable equipment will be required, including a few machine tools.

The Buckeye Steel Castings Company, Columbus, Ohio, has placed an order with the Thomas Carlin & Sons Company, Pittsburgh, for considerable foundry equipment that will greatly increase its present capacity.

The plant of the Ohio Marble Company, Piqua, Ohio, was destroyed by fire December 6, causing an estimated loss of $50,000. Rebuilding plans are already under way, and the company will probably need considerable power plant and other equipment.

## Detroit

DETROIT, MICH., December 17, 1912.

The local machine tool market is feeling the usual end of the year dullness and the volume of new business is gradually growing lighter. No large lists are before the trade, but there is a fair run of orders for single tools. Inquiries are less numerous and dealers figure that business will continue slack until the second or third week in January, the holiday season and the fact that many manufacturers will soon be engaged in taking the annual inventory combining to hold back purchases temporarily. Second hand machinery is moving slowly. There is a substantial current demand for electrical equipment in the smaller units. Representatives of crane manufacturers state that the market for handling equipment is good in this territory.

Work in building lines is beginning to show a diminishing volume, indicative of preparation for the reduction of activity imposed by winter weather, but a number of factories are contemplating plans for additions on which work will be carried on throughout the winter.

The Detroit Can Company, the local branch of the American Can Company, is asking for bids covering the erection of extensive additions to its plant. The enlargements will involve the expenditure of about $125,000 and will include a new manufacturing building 80 x 100 ft., three stories, a box and crate factory 60 x 120 ft., one story, an additional story on the present factory and a one-story warehouse. E. E. Andrews, Detroit manager, can probably give information as to machinery requirements.

The White Star Refining Company, Detroit, has awarded the contract for the erection of a new factory building at Avery and Marquette avenues.

The Pendry Button Company, Detroit, has been incorporated with a capital stock of $100,000 to manufacture pearl buttons and special machinery incidental thereto. The incorporators are: William A. Pendry, Fred H. Aldrich and Prescott M. Hulbert.

The Standard Tool & Mfg. Company, Detroit, has been organized with $20,000 capital stock by John G. Heal, Robert C. Dorman and Thomas P. Penniman to manufacture special tools, hardware specialties and automobile accessories.

The Detroit Forging Company, Detroit, has awarded the contract for the erection of a new factory building on Meldrum avenue.

The Peninsular Tool Salvage Company, Detroit, has been incorporated with $5,000 capital stock to repair and manufacture tools. The incorporators are: Hadley H. Lavercombe, R. W. Nicholayson and John T. Campbell.

The Americus Products Company, Detroit, has been incorporated with $2,500 capital stock to manufacture cleansers. William A. Black is the principal stockholder.

The Simplex Brooder Stove Company, Grand Rapids, Mich., has filed articles of incorporation giving its capital stock as $15,000. The new company will manufacture poultry appliances. N. C. Sylvester Husted is the principal stockholder.

The Commonwealth Power Company, Jackson, Mich., has asked the State Railroad Commission to authorize a bond issue of $457,000. If the issue is authorized, the proceeds will be used for extensions and additions to plants owned by the company as follows: Pontiac Power Company, $5,000; Flint Electric Company, $9,000; Consumers Power Company, of Kalamazoo, $19,000; Bay City Power Company, $4,000; Saginaw Power Company, $27,000; Grand Rapids & Muskegon Power Company, $92,000; Economy Power Company, $14,000; Commonwealth Power Company, of Jackson, $86,000; Au Sable Electric Company, $201,000.

The Great Western Mat Company, Muskegon, Mich., has been incorporated with $15,000 to manufacture fiber matting. The incorporators are: Frank G. Ruddiman, Daniel O'Brien and P. Fred Nelson.

## The Central South

LOUISVILLE, KY., December 17, 1912.

While there has been a slight seasonable falling off in general business, practically all iron and machinery lines report that they are busy, and that indications are for the best December experienced in several years. The machine tool and supply trade is especially brisk, dealers in those lines stating that orders show no diminution whatever. Dry and open weather prevailing throughout the fall and up to this time has enabled work of all kinds to go forward with undiminished speed, without interruption, and this has probably had its effect in the unusual liveliness displayed.

Among the recent sales of the James Clark, Jr., Electric Company, Louisville, are the following: To E. H. Taylor, Jr. & Sons, a large distilling firm of Frankfort, Ky., a Skinner engine and 30 kw. direct-connected generator; to the Quast Mfg. Company, Louisville, shoe manufacturer, ten three-phase 60-cycle, 440-volt motors, constituting a complete electrical installation for the operation of the company's plant, including all machinery and the elevators; to the Sterling Paint & Color Company, Louisville, two motors, one 40 hp. and one 10 hp., to take the place of equipment recently damaged by fire; and to the Evansville Steel Scaffolding Company, Evansville, Ind., a complete electrical installation, consisting of ten induction motors, rating from 5 to 10 hp.

The J. J. Reilly Mfg. Company, Louisville, manu-

facturer of steam pumps, has recently completed the installation in the plant of the New Orleans Sugar Mills Company, near New Orleans, of four large refining pumps for use in the handling of the syrup in the various stages of manufacture. The pumps measured 4 ft. 10 in. x 12 in. and 14 in.

Among the orders recently filled by the Henry Vogt Machine Company, of Louisville, for its horizontal tubular boilers, are those of the following firms and corporations, the size of the boiler being indicated in each case: Hodapp Hominy Company, Seymour, Ind., one 77 in. x 18 ft.; G. C. Hallauer, Marshall, Ill., two 72 in. x 18 ft.; John Cutherell, Norfolk, Va., one 72 in. x 16 ft.; Mengel Box Company, Louisville, Ky., one 72 in. x 18 ft.; Simpson County Lumber Company, Franklin, Ky., one 66 in. x 16 ft. boiler and a 50 hp. engine; Meyers & Sandusky, Columbia, Ky., one 60 in. x 16 ft.; Cannelton Public Service Company, Cannelton, Ind.; two 71 in. x 16 ft. boilers; Paducah Box & Basket Company, Paducah, Ky., two 72 in. x 16 ft. boilers.

The Hillenbrand Brick Company, Louisville, Ky., manufacturer of building brick and other clay products, is in the market for a brick machine.

The Board of Aldermen, of Covington, Ky., has appointed a committee consisting of W. A. Byrne, George Beach and W. T. Smith to make an investigation as to the probable cost and other details of the installation of a municipal lighting plant which the city has under consideration.

The Charles C. Stoll Oil Company, Louisville, Ky., contemplates establishing at Lexington, Ky., a branch plant and refinery, for the purpose of producing and distributing its products for eastern and central Kentucky.

The Mt. Sterling Water, Light & Ice Company, Mt. Sterling, Ky., which was among the plants reported to have been purchased by the interests which recently organized the Kentucky Utilities Company, has passed into the hands of the corporation named, deeds to that end having been duly filed. It is reported at that place that a hydroelectric power plant will be established near the mouth of Dix River by the Dix River Power Company to supply power to the Mt. Sterling and other plants which have been acquired by the Kentucky Utilities Company.

The Henderson Mining & Mfg. Company, Henderson, Ky., is said to be contemplating the erection in that city of a large cold storage plant, to answer the demand from the orchard industry in that vicinity. The company recently remodeled its plant and added boilers and other equipment sufficient to double its ice capacity.

The City Council of Winchester, Ky., has under consideration additions to its water plant, and extensions of the lines. The machinery wants of the municipality will be outlined shortly.

The denomination known as the Seventh Day Adventists, is negotiating with parties in Elizabethtown, Ky., for the establishment at that place of a canning factory and training school. The denomination controls a similar plant at Clarkson, Ky.

The City Board of Health, Paducah, Ky., is considering the proposition of establishing a garbage incinerating plant in that city to dispose of refuse. The cost of such a plant is estimated at about $7,000.

The State Board of Health, Frankfort, Ky., is considering the construction in that city of a central abattoir.

The Loose Leaf Warehouse Company, Greensburg, Ky., proposes to increase its capital stock from $15,000 to $25,000, for the purpose of erecting another storage building and a redrying plant, the latter to be equipped with modern heating and drying machinery.

Col. T. G. Stuart, of Winchester, Ky., has secured a franchise for the construction and operation in Jackson, Ky., of a waterworks system, and will at once begin work on the plant.

The Clear Creek Coal Company, Providence, Ky., of which F. V. Ruckman is president, operating 490 acres of land with a daily production of 1200 tons, intends to install either a 200-k.w. generator and mining machinery or an air plant.

Superintendent Robert I. Hamilton, Vincennes, Ind., will establish in the city schools after the first of the year a system of vocational training, for which some small machinery equipment will be needed.

The Guilford Farmers' Union Buggy Company, Guilford, N. C., has been organized with a capital stock of $50,000, to manufacture buggies, and woodworking and other machinery will be purchased. The incorporators are Albert Peele, Jeremiah M. Brown, Earnest H. Copeland and B. Frank Copeland.

The Denmark Machine Works Company, recently organized at Denmark, S. C., wants a foundry outfit or cupola melting from 3 to 10 tons.

The Sumter Telephone Mfg. Company, Sumter, S. C., will increase its capital stock from $60,000 to $500,000, for the purpose of extending its facilities for the manufacture of magnetos. Large additional equipment will be necessary in this connection.

L. Jones & Co., Nashville, Tenn., manufacturers of ladies' clothing, will erect and equip a six-story building in that city for use as a factory and office building. Considerable manufacturing equipment will be added, a complete lighting plant will be installed and three elevators will be required. The contract has been awarded to the Edgefield & Nashville Mfg. Company.

The Duplex Multiple Jack Company, Norfolk, Va., recently organized with a capital stock of $25,000, will probably erect and equip a plant for the manufacture of jacks. James W. Tierney is president, J. H. Totten vice-president and William J. Fuller secretary and treasurer.

The property of the Dominion Coal Company, near Bristol, Tenn., has been sold under a Federal Court judgment to Charls W. Bondurant, of Bristol, president of the Bondurant Coal Company, for $50,000. The purchaser intends adding to the equipment of the mine and increasing its output from 10,000 to 25,000 tons.

The plant of the W. S. Milne Chair Company, at Cleveland, Tenn., has been totally destroyed by fire, with a loss of $250,000, two-thirds of which is covered by insurance. It is reported that the plant will be rebuilt at Chattanooga, in accordance with previous intentions of the company, a 40-acre site having been secured there.

## Birmingham

BIRMINGHAM, ALA., December 16, 1912.

Outside of orders in numbers of lines placed by the Alabama Interstate Power Company, which is expending $5,000,000 in power development on Alabama rivers, current business in mine pumps and a continuance of a good demand for small goods, the machinery trade is enjoying its normal holiday inactivity. Pending inquiries, however, suggest an excellent business early in the year, especially with the sawmills and new factories of several kinds that are being built.

The Private Water Company's holdings at Raleigh, N. C., have been valued at $192,000 by James N. Hazlehurst, engineer, of Atlanta. The city will take over the property and spend $500,000 in improvements or build a new plant.

Excavation has begun at Lawrenceville, Ga., for a fertilizer works with a capacity of 200 tons to be established by the Lawrenceville Fertilizer Company. Ambrose T. Greene will be manager of plant.

C. Castellano and others will establish a macaroni plant employing 40 men in Jacksonville, Fla., in January. Latest electric machinery is to be used.

W. S. Keyser, Pensacola, Fla.; Bascom Parker, Niles, Mich., and the Florida Timber Products Company, of Michigan, with a capital stock of $1,000,000, are the parties interested in the purchase of 142,000 acres of timber land in Calhoun County, Fla. The purchasers will establish at St. Joe, Fla., a sawmill with a daily capacity of 75,000 ft. W. S. Keyser is president.

Application has been made at Jacksonville, Fla., for the incorporation of the La Crosse Investment Company with a capital stock of $2,000,000 to operate sawmills, tramroads, etc. R. H., John J. and A. G. Paul, Watertown, near Lake City, Fla., are the incorporators.

The American Radiator Company has begun work on its $500,000 factory at North Birmingham on a tract of 15 acres. The main building is to be of concrete, steel and brick, 250 x 1050 ft., with warehouse of two stories half as large. The new factory is to furnish southeast trade and replace small leased factory in Birmingham.

W. J. Upchurch, William Godfrey and J. W. Maynard have incorporated the Upmago Lumber Company with $10,000 capital stock to operate sawmills near Thomasville, Ga.

The Geneva Mill Company, D. H. Morris secretary, will establish planing mill at Geneva, Ala., with a daily capacity of 100,000 ft.

The Boyd-Morton Mfg. Company, Birmingham, has been incorporated with a capital stock of $50,000 for the manufacture of metallic devices.

The Acme Steam Laundry, Columbus, Ga., will install additional machinery.

J. T. Smith, gas machinery manufacturer, of New York, is negotiating for franchise to establish gas plant at St. Petersburg, Fla.

A municipal disposal plant will be established at Orlando, Fla., under the direction of the city engineer, G. R. Ramsey.

The St. Petersburg Ornamental Stone & Brick Company of St. Petersburg, Fla., with a capital stock of $15,000, has been chartered by J. F. Brown, L. Jackson, J. S. Reed and others. A plant to have a capacity of 10,000 bricks a day will be established.

The Pratt Consolidated Coal Company, Birmingham, will rebuild at once property burned at convict mine prison at Banner. Property destroyed embraces tipple, coal washer, bins, etc. Loss was $40,000. Rebuilt plant will be modern and permanent.

The National Cast Iron Pipe Company, Birmingham, Ala., is receiving bids for a complete equipment for machine shop and pattern shop, including lathes, milling machines and in fact all machinery such as used in a modern pipe foundry, including cranes and cupola. The company requests the literature of all manufacturers who are interested. Bids are being received for the construction for foundry buildings, pits, etc.

## St. Louis

ST. LOUIS, MO., December 16, 1912.

In the machine tool market quietude prevails as is to be expected at this period of the year, but inquiries which are coming in, together with the general information as to trade condition in the territory tributary to this point, are encouraging of better business as soon as the inventory period and trial balance date is passed. The business at present is on small orders, but the aggregate of inquiries is of the best type.

The T. J. Moss Motor Car Company, St. Louis, with $10,000 capital stock, has been incorporated by T. J. Moss, J. W. Fristoe and E. J. Dykstra to establish a garage and repair plant for automobiles.

The Sani Sales & Mfg. Company, St. Louis, has been incorporated, with $10,000 capital stock, by J. O. Chenoweth, J. L. Meeker and Charles E. Blair to engage in a specialy manufacturing business and has bought a Kansas City concern, which will be moved entire to St. Louis.

The Minhot Electrica Mfg. Company, St. Louis, with $50,000 capital stock, has been incorporated by Henry G. Cady, John T. Brown, Charles F. Pezolt, S. J. Thorwegen and J. L. Finnegan to manufacture and deal in electrical appliances.

The Marian Folding Umbrella Company, Joplin, Mo., has been incorporated, with $15,000 capital stock, by M. T. Marian, W. W. Browne and Joseph Stein to equip a plant for the manufacture of a patented umbrella frame.

Incorporation of the Rotary Washing Machine Company, St. Louis, with $50,000 capital stock, previously referred to, has been formally effected by Henry and Alvina Brammer and Charles W. Steele.

The B. F. Goodrich Rubber Company of Michigan has been authorized to use $75,000 of its capital of $500,000 in St. Louis. Its plans as to branch plant, etc., have not been announced.

The Federal Rubber Mfg. Company is to have a building erected for its plant at 3146 Locust street, St. Louis, which it will occupy with an enlarged equipment as soon as completed.

The Louisiana Development Company, St. Louis, with $45,000 capital stock, has been incorporated by J. B. Lamorere, M. C. Baker, A. Graham and W. E. Howett to equip mills for handling timber on lands controlled by them in Louisiana.

The Mutual Brewing Company, St. Louis, has been authorized to increase its capital stock from $400,000 to $600,000 for the purpose of still further increasing the capacity of its plant now in course of completion.

The Oklacereal Company, Shattuck, Okla., with $40,000 capital stock, has been incorporated by J. W. Williams, of that city, and J. E. Mette and J. A. Jenkins, of Cochise, Ariz., to equip a cereal manufacturing plant.

The Stern Foundry & Machine Company, New Orleans, La., is reported to have purchased a site for the construction and equipment of a new and larger plant, to which removal will be made.

The Haldey Mfg. Company, New Orleans, La., has been incorporated, with capital stock of $25,000, by A. N. Haldey, Frank White and Morris E. Cox to manufacture a new cane harvesting device.

The Orr Mfg. Company, recently reported as organized with $500,000 capital stock, for the manufacture of automatic oil pressing machinery, has elected William Hamel, of Yazoo City, Miss., president, and is considering plans for the construction of a plant.

The J. B. Wood Plow Works Company, North Muskogee, Okla., will erect a plow manufacturing plant. The company, with $300,000 capital, was recently incorporated by H. C. Baker, Thomas Duncan, T. P. Smith, Carl Pursel and J. B. Wood.

The Deeson Oil Company, Deeson, Miss., with $100,000 capital stock, has been incorporated by J. C. Brooks, F. S. Miller, W. F. Markle to equip and operate oil lands controlled by them.

A cold storage plant, with machinery to cost about $15,000, is planned to be constructed at Harrodsburg, Ky., by the firm of Brown & Smith.

The Osage Producer Gas Company, Bartlesville, Okla., with $50,000 capital stock, has been incorporated by H. C. Moore, C. V. Sellers and Thomas F. Gorman to equip property controlled by them.

A plant to cost about $15,000 will be placed on mining lands at Webb City, Mo., by the Otis Mining Company, 918 South Madison street, recently incorporated with $20,000 capital stock, by Harvey H. Lord and others.

The Kimberlite Diamond Mining & Washing Company, with offices in the Third National Bank Building, St. Louis, is constructing a washing plant of African type at the Mauney mine near Murfreesboro, Ark., with a daily capacity of about 300 loads.

The Wilson Oil Company, Okmulgee, Okla., with $100,000 capital stock, has been incorporated by J. Condit Smith, of Chicago, Ill.; B. F. Dawson, of Philadelphia, Pa., and M. S. Wilson, of Okmulgee, to operate property controlled by them.

The Daily-Morton-Brown Laundry Company, Muskogee, Okla., with $15,000 capital stock, has been incorporated by Garret J. Daily, Edward M. Morton and George R. Brown and will equip a plant at once.

The Heald Mfg. Company, Laurel, Miss., will succeed to the Laurel Mfg. Company and the De Soto Naval Stores Company and will equip a plant with about $15,000 worth of machinery.

The Adkins Mfg. Company, Bath, Ill., is reported to contemplate the equipment of a plant at Joplin, Mo., for the manufacture of miners' lamps.

The Thym Cut Stone Company, St. Louis, has purchased a site on which to erect and equip a plant for the conduct of its business, which is to be extended materially at once.

The Hubbard Glass Company, Tyro, Kan., is preparing to construct a plant for the manufacture of lamp chimneys at Sand Springs, Okla.

The Elmer Oil Company, Okmulgee, Okla., with $100,000 capital stock, has been incorporated by George F. Priest and W. E. Grayson, St. Louis, Mo., and Thomas A. Bell, Okmulgee, to equip and operate land controlled by them.

The Good Hope Oil & Gas Company, Shawnee, Okla., with $50,000 capital stock, has been incorporated by Thomas W. Cadick, A. L. Albin, Paul F. Cooper and A. J. Cammack to equip and operate oil land controlled by them.

A. C. Enochs, J. T. Dickerson, J. W. Mann and others of Oklahoma City, Okla., have incorporated the Petroleum Oil & Gas Company, with $100,000 capital stock, to operate and equip oil lands controlled by them.

The city of Vicksburg, Miss., has defeated a proposition to buy its city waterworks and will now vote upon a proposition to issue bonds for the construction of a new plant.

A company to construct a hydroelectric plant on the Osage River in Missouri is in process of organization by C. R. Hunt, of Osceola, Mo.

G. Y. Crawford, of Cleveland, Miss., will equip stave, hoop and heading mills on timber lands bought by him near Security, La.

R. S. Greenstate & Son, of Rich Hill, Mo., will build and equip a plant for the manufacture of handles and will utilize about $2,000 worth of machinery.

The Sulphur Springs electric light plant at Sulphur Springs, Ark., owned by J. H. Bexton, of Omaha, Neb., was burned recently with a loss of $12,000. It will be replaced.

An electric light plant is to be built at Gravette, Ark., by a committee of the municipal government and

bids thereon will be received until January 6. The engineers are Nagel & Peterson, of Muskogee, Okla.

The Sanitary Metal Kitchen Cabinet Company, Hot Springs, Ark., with $25,000 capital stock, has been incorporated by I. O. Curtice, C. W. Appleby, Guy Phillips and L. C. Andrews and will equip a plant at once, it is reported.

The W. A. Laidlaw Wire Company, Kansas City, Mo., has leased a factory at Peoria, Ill., and will move its business to that city, where it expects to be in operation within 60 days.

## Texas

AUSTIN, TEXAS, December 14, 1912.

Generally speaking, the year 1912 has been a most prosperous one for not only the machinery trade but nearly all other lines of business and industry. The increase in sales is very gratifying and prospects for a continuation of the era of prosperity could hardly be brighter. It is stated that collections have been better than ever known. There are comparatively few outstanding accounts and, on the whole, the trade is on about as solid a basis as could be hoped for. Generous winter rains have fallen in the past week over practically the entire State putting another good season in the ground, or at least insuring a good start for the spring crop. In southern Texas planting will begin in about one more month. Already large shipments of winter vegetables are being made to markets from the extreme southern portion of the State and this movement of produce will gradually increase until it reaches its greatest hight in February and March.

The Muller Broom Company, Galveston, will enlarge the capacity of its broom making plant so as to increase its output from 40 dozen brooms per day to 74 dozen.

The J. C. Minus Land & Irrigation Company, San Antonio, has been organized with a capital stock of $48,000 for the purpose of constructing a system of irrigation in Dimmitt County. The incorporators are J. C. Minus, Barton W. Perry and John Cotter.

The Snyder Power & Light Company has been organized at Snyder, with a capital stock of $25,000. The incorporators are E. W. Clark, P. L. Fuller and M. A. Fuller.

The Texas Power & Light Company, Dallas, has purchased the site for its proposed electric power plant that it is to install on the Oklahoma side of the Red River just north of Denison, Texas. It is stated that this hydroelectric station will be of large capacity and that power transmission lines will be constructed from it to Denison and a number of other towns in that section. The Texas Power & Light Company has also applied to the City Council of Denison for a franchise for the lighting, heating and power system.

Armour & Co., will erect a cold storage plant at Texarkana, Texas, at a cost of about $50,000.

The Port Arthur Ice & Refrigerating Company will enlarge its ice plant at Port Arthur, at a cost of about $25,000.

The Commissioners Court of Waller County has under consideration the building of a number of bridges in different parts of that county.

Skinner & Sons, who recently leased from the State its iron furnace and auxiliary plants at Rusk, will make repairs and reopen the industry in a short time. The lessees will erect 75 dwellings for the housing of their employees.

The City Commission of Houston, has awarded the contract for the laying of sewers in the First, Fifth and Sixth wards to F. D. Horton & Sons, at a cost of about $80,000.

The People's Cotton Oil Company has been organized at Sulphur Springs, with a capital stock of $50,000 for the purpose of erecting a cotton-seed oil mill. The incorporators are W. G. Murray, F. W. Betts and C. M. Houston, all of Sulphur Springs.

The Corsicana Petroleum Company has increased its capital stock from $300,000 to $1,500,000. It will make extensive improvements to its refinery at Corsicana.

Plans are being prepared for a new water filtering plant that is to be installed by the city of Houston near Sims Bayou. The proposed plant will contain screen chambers, Imhoff tanks, sprinkling filters, sand filters and hypo-chloride tanks for disinfection.

Ernesto Madero, minister of finance of the Mexican Government, is preparing to erect a flour mill at Nuevo Laredo, Mexico, to have a capacity of 400 barrels per day. He has purchased a site for the proposed mill.

## The Pacific Coast

PORTLAND, ORE., December 10, 1912.

Local machine tool dealers report a very satisfactory volume of business for this season. A few single orders of some importance have been booked recently, while inquiries for single tools and small groups are keeping up very well. It is doubtful whether any further important business will come out before January, but from the amount of work on hand at shops in the Columbia River and Puget Sound districts dealers anticipate an active market during the spring. Railroad buying has been an important factor for the last few months, and further business is expected from this source next year. The expenditure of about $3,000,000 for improvements on the Oregon, Washington Railroad & Navigation lines in 1913 has been authorized, including work on the Spokane-Snake River cutoff, and straightening the main line along the Columbia River. Many smaller railroads are also planning improvements, and construction contracts are expected soon on new hydroelectric development. Alaska mining and fishing interests are coming actively into the market for machinery of many types. The lumber market remains in highly satisfactory shape, the mills in some districts being hampered at present by a shortage of logs. A large amount of dredging and harbor improvement work is in contemplation, and bids for several projects were taken last week at Seattle, Wash. Two new government dredging contracts have just been let in the Hawaiian Islands.

Arrivals of copper ore from Alsaka and British Columbia at the Tacoma smelter have been unusually heavy of late, about 16,000 tons having arrived since the first of the month.

The Aurora Copper Mining Company is planning to install a new plant at Chewelah, Wash., including a 100-ton concentrator and other machinery to cost about $100,000.

The 100-stamp quartz mill recently erected at the Alaska-Perseverance mine, near Juneau, Alaska, at a cost of about $250,000, was destroyed by fire last week. According to the report from Juneau, the mill will be rebuilt.

The Peerless Air Motor Company has been looking into conditions with a view to establishing a factory here.

The city of Seattle, Wash., will take bids this week for two 400-kw. transformers.

The Sandberg Beet Harvester Company, Ogden, Utah, is planning to install an implement factory at Salt Lake City.

The Red River Lumber Company, operating near Susanville, Cal., has installed an electric light plant and ordered a drag-line ditcher. A large double bandsaw mill will be installed next year.

The Hercules Vise & Mfg. Company has been incorporated at San Francisco, with a capital stock of $200,000, by H. Peterson, A. W. Peterson and W. H. Buttner.

The Crossett Timber Company, Davenport, Iowa, has purchased a sawmill at Wauna, Ore., and intends to install a new plant next year.

The Empire Machine Works, this city, is perfecting a two-cycle gasoline logging engine, which it expects to have on the market in about six months.

The Contractors' Equipment & Supply Company, Seattle, Wash., have taken the agency for the Orenstein-Arthur Koppel Company for that district.

The Nestos Timber Company, Bellingham, Wash., is having an aerial cable logging outfit installed by the Washington Iron Works. Electric power will be used.

The Hammond Lumber Company, Astoria, Ore., will start work early in the year on several miles of logging railroad.

The Betterton-Morgan Company, Seattle, Wash., has authorized the building of a machine shop which will be 40 x 80 ft. and two stories.

## Canada

WINNIPEG, MAN., December 13, 1912.

Local machinery houses report business moderate, a usual experience at this time of the year. The outlook continues very encouraging. All indications point to a brisk spring season. The general business situation in these provinces is apparently very healthy, and there seems to be no doubt that there will be much industrial expansion in the coming year.

It is announced that the city of Prince Albert, Sask., will spend between $150,000 and $200,000 next year on a power and light plant. It is also said that the city

S. DIESCHER & SONS
Mechanical and Civil Engineers
PITTSBURGH, PA.

of Regina, Sask., will spend about $500,000 on improvements to the light and power plant there.

A by-law will be submitted to vote in New Westminster, B. C., in January to provide $100,000 for extensions to the waterworks plant there.

By-laws were recently passed in Summerland, B. C., providing $100,000 for extensions to waterworks plant and $50,000 for improvements to the electric light plant.

The Town of Wetaskiwin, Alberta, is preparing to install a sewage plant. The general contractor is the John Galt Engineering Company, Winnipeg and Calgary.

The Canadian Puget Sound Lumber Company, Ltd., Victoria, B. C., is planning to begin the construction of a large new lumber mill soon. It will be electrically driven.

George Barr, Gladstone, Man., will establish a brick-making plant at Estevan, Sask.

The Thurber Syndicate will erect a machine shop at Kenora, western Ontario, at a cost of $25,000. The secretary of the company is James Weidman.

The Calgary Brewing & Malting Company is planning to establish a cold storage plant at Swift Current, Sask.

The Ford Milling Company will erect a 1000-barrel flour mill at Swift Current, Sask.

The Pacific Box Company, Vancouver, B. C., will erect a sawmill at a cost of about $25,000. It will have box-making machinery also.

The Commercial Cars Company, Ltd., Luton, Bedfordshire, England, is contemplating the erection of an automobile factory at Vancouver, B. C.

J. Lemon Gonnason & Co., Ltd., Orchard street, Victoria, B. C., will erect a factory to manufacture compressed fuel from refuse material from the sawmills.

The Weyburn Sash, Door & Glass Company, Weyburn, Sask., will enlarge the capacity of its plant early next year.

The Barnett Lumber Company, Ltd., has started erecting a large lumber mill at Silver Creek, B. C.

The Campbell River Lumber Company, Ltd., Hazelmere, B. C., will erect a shingle and planing mill in connection with its lumber mill.

N. Peterson, Spokane, Wash., and his associates will erect a large lumber mill at Green City, B. C., next year.

The town of Port Alberni, B. C., is planning to establish an electric light plant at a cost of $20,000. The engineer is W. Anderson, Vancouver.

The Fritz Steiner Brewing & Malting Company, Ltd., Nelson, B. C., will build a brewery at a cost of $50,000. A. S. Horswill is president.

James Leigh & Sons, lumber manufacturers, Victoria, B. C., are preparing plans for enlarging their plant.

The Johnstone Strait Lumber Company, Ltd., Vancouver, B. C., has been incorporated, with a capital stock of $500,000, and will build a sawmill.

The Seaman Kent Company, manufacturer of hardwood flooring, Fort William, will double the capacity of its plant in the spring.

A. C. Dunning, Saskatchewan Co-operative Elevator Company, Regina, Sask., says that during the coming year his company will erect at least 50 elevators at different points in the province.

The Standard Tube & Wire Fence Company, Woodstock, Ont., E. W. Nesbit, manager, is having plans prepared for extensive additions to be made to its plant.

The National Cash Register Company has had plans completed for a Canadian branch plant to be erected on Christie street, Toronto, to comprise three buildings of steel and brick construction, 60 x 300 ft., 60 x 400 ft. and 60 x 500 ft., and two stories, respectively.

Plans are being prepared for a sash and door factory to be built by Reitzel Bros. at an estimated cost of $30,000.

The Northern Navigation Company, M. Gildersleeve, manager, Sarnia, Ont., will build at Point Edward, Ont., near Sarnia, a refrigerator and ice house of 200,000 tons capacity and a warehouse and laundry building, 50 x 50 ft., two stories and basement.

---

The Gray Iron Foundry Company, Reading, Pa., has purchased the plant of the National Brass & Iron Company, at Tulpehocken and West Green streets, in that city, and covering about two acres. It is the intention to re-equip the brass and the iron foundry and to use the plant for the manufacture of brass and iron hardware novelties. The new addition will treble the capacity of the company.

## Trade Publications

**Vibrating Screens.**—Jeffrey Mfg. Company, Columbus, Ohio. Bulletin No. 69D. Describes and illustrates a vibrating screen for handling various materials. One of the special features claimed for this screen is the exact sizing of the material by reason of the ability to vary the angle of the screening surface. An illustrated description of this screen appeared in *The Iron Age*, October 3, 1912.

**Steam Turbines.**—Connecticut Turbine Mfg. Co., New London, Conn. Circular. Relates to the Connecticut turbine which is built in sizes ranging from 25 to 500 hp. and any desired speed for driving pumps, blowers, dynamos or for belted service. A half-tone engraving of the turbine is given together with a list of its special points of superiority.

**Forge Blowers.**—American Blower Company, Detroit, Mich. Circular. Relates to the Sirocco electric forge blowers, which are built in three sizes for handling light, medium and heavy fires. The smallest blower uses less than half the current consumed by an ordinary electric lamp and the larger sizes have a relatively equal efficiency.

**Metal Cutting Machines.**—Racine Tool & Machine Company, Racine Junction, Wis. Circular. Deals with a heavy duty high speed cutting machine which has an automatic positive lift on the return stroke and operates on the draw-cut principle. The machine, an illustrated description of which appeared in *The Iron Age*, October 3, 1912, is shown, and there is a brief table of specifications in addition to the text description.

**Gasoline Electric Generating Sets.**—B. F. Sturtevant Company, Hyde Park, Mass. Mailing card. Concerned with a gasoline electric generating set which is a complete self-contained unit designed for use wherever an independent electric plant is desired. The construction of the set, which was illustrated in *The Iron Age*, October 24, 1912, is briefly described, the text being supplemented by an engraving of the smallest or 5-kw. size.

**Centrifugal Pumps.**—Goulds Mfg. Company, Seneca Falls, N. Y. Circular. Illustrates and briefly describes a vertical single-stage, single-suction centrifugal pump, which was illustrated in *The Iron Age*, October 3, 1912. Six sizes of pump, ranging in capacity from 270 to 3000 gal. per min., are built.

**Oil Engines.**—Remington Oil Engine Company, 120 Broad street, New York City. Mailing card. Deals with a line of marine and stationary oil engines. The latter are built with one, two and four cylinders and are used both directly connected and belted for driving electric generators, centrifugal, deep well and triplex pumps, air compressors, hoists, milling machinery, ice machines, ditch diggers, stone cutters and many other kinds of machinery. The several types of engines are illustrated, the views showing the engines in use for a number of different purposes.

**Power Press.**—Max Ams Machine Company, Mt. Vernon, N. Y. Catalogue A. Illustrations and descriptive matter explain the operation of a line of power presses and special machinery for working sheet metals. The various features of the presses, such as a pin clutch, an automatic draw clutch and the screw and eccentric adjustments for the pitman and slide are first taken up, followed by descriptions of the various machines.

**Power Hammers.**—Beaudry & Co., Inc., 141 Milk street, Boston, Mass. Pamphlet. Pertains to the Beaudry line of power hammers, which are built in two different styles, for rams ranging from 50 to 500 and 25 to 200 lb. respectively. The fields for which these hammers are adapted are first given, followed by an illustrated description of each. Tables of specifications and a partial list of users are included. One of these hammers, the Peerless type, was illustrated in *The Iron Age*, October 3, 1912.

**Power Plant Equipment.**—Schutte & Koerting Company, Philadelphia, Pa. Catalogue. Lists a complete line of equipment for power plants, which includes injectors, condensers, valves of various types, oil burning systems, furnace blowers and chimney ventilators. All of these are illustrated and briefly described and in several cases partial lists of users are appended.

**Power Transmission Machinery.**—Dodge Mfg. Company, Mishawaka, Ind. Catalogue No. 106-A-12. Gives general description and specifications for a line of power transmission machinery which includes shafting, couplings, hangers, bearings, pulleys and belting. All of these are illustrated and briefly described with condensed tables of prices.

**Mill Supplies, Etc.**—E. D. Morton & Co., machinery dealers, Louisville, Ky. Catalogue of 757 pages, bound in red cloth. Covers the firm's general line of mill supplies, machine shop supplies, steam specialties and power plant equipment. Special lines featured are C. A. Claflin & Co.'s hose fittings and automatic and continuous boiler tube cleaners; Williams improved safety feed water regulator, pump governor and steam traps; Homestead straightway valves; Belmont packings; Webster Mfg. Company's conveying and elevating machinery; Hercules hangers and shafting appurtenances, made by the Valley Iron Works; Hyatt roller bearings, and a number of others. The book has been put up in loose-leaf form, interlined with blank pages and handsomely bound in flexible black leather, for the use of the firm's salesmen.